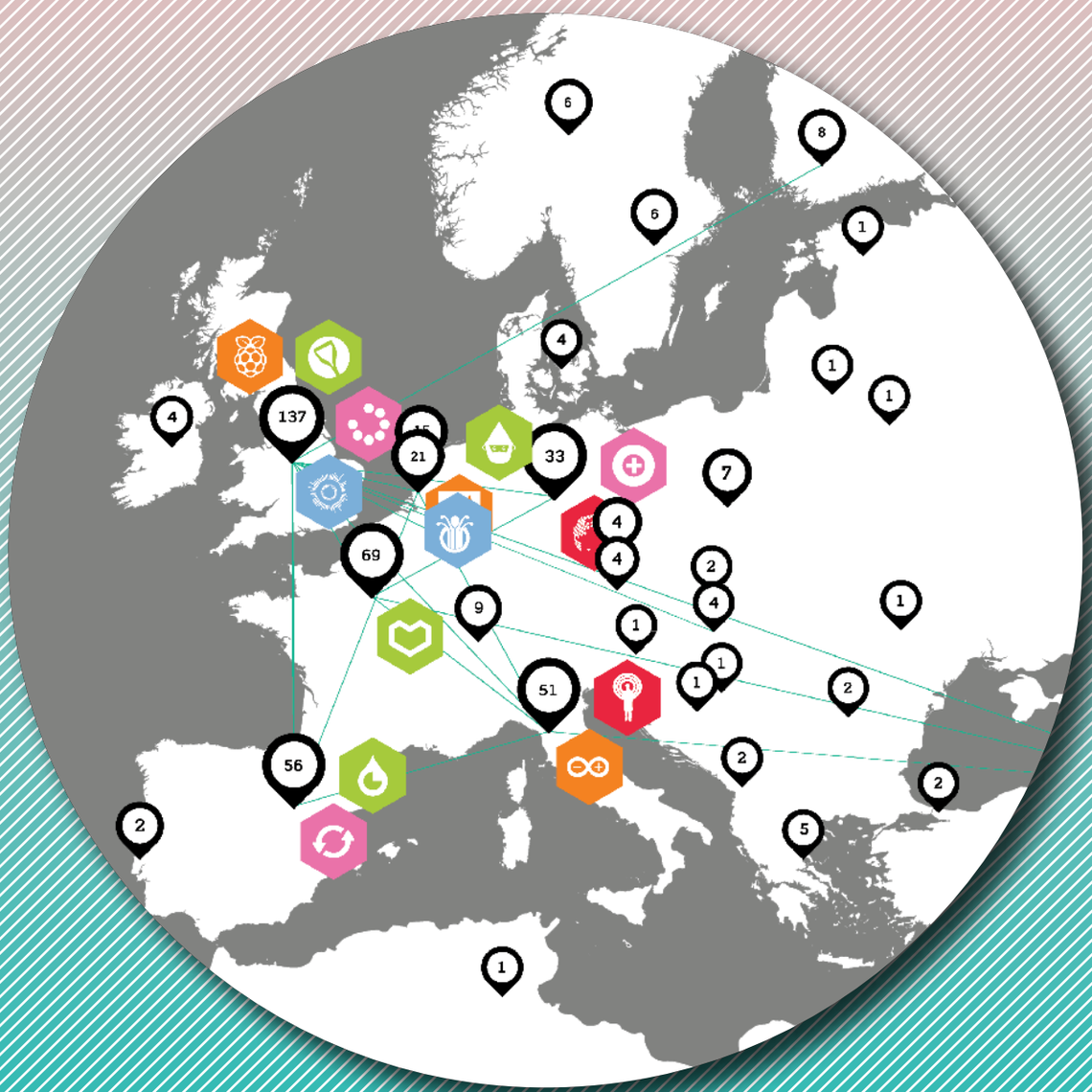
Ref. Ares(2016)1662421 - 07/04/2016

European Commission

# GROWING A DIGITAL SOCIAL INNOVATION ECOSYSTEM FOR EUROPE

## DSI FINAL REPORT




**A study prepared for the European Commission DG Communications Networks, Content & Technology by:**

DIGITAL SOCIAL INNOVATION

Contract no. 30-CE-0531673/00-86
SMART 2012/0049

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ISBN: 978-92-79-45603-9
DOI: 10.2759/448169

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**This study was carried out for the European Commission by:**

**PARTNER DESCRIPTIONS**

**Nesta**
Nesta is the UK's innovation foundation with a mission to support innovation for the public good. Established in 1998 by central government, Nesta transitioned to an independent charity in 2012. Nesta is backed with an endowment originally provided from the UK National Lottery and works through a combination of research, investments, networks, grant funding and practical support to innovators with the aim of helping people and organisations bring great ideas to life.

**The Waag Society**
Waag Society, Institute for Art, Science & Technology, is an interdisciplinary non-profit media lab based in Amsterdam. Its mission is to provide meaning and give direction to the role of technology in society. Founded in 1994, Waag Society is part of the Dutch national infrastructure for the arts and culture, and a well-known participant in national and international collaboration programmes.

**ESADE, Center for Innovation in Cities**
The Center for Innovation in Cities is interested in the study and analysis of these innovation processes. Under the Institute of Innovation and Knowledge Management of ESADE Business and Law School, it brings together a group of academicians and practitioners with experience in open innovation, new technologies and public administration, particularly interested in improving the management of cities in the 21st century.

**IRI, Institute for research and innovation**
In 2006, the Centre Pompidou founded the Institute for Research and Innovation on initiative of the philosopher Bernard Stiegler. The institute has been created as part of the Centre Pompidou to anticipate, accompany and analyse the transformation of cultural practices enabled by digital technologies. IRI offers a wide-ranging foundation of talent in both understanding the theoretical sources of innovation, and cutting-edge research into technical questions and design.

**FutureEverything**
FutureEverything (FUTURE) is a not-for-profit digital innovation lab, festival and conference. It is a member of ENOLL (European Network of Living Labs). FUTURE engages a worldwide community in devising and testing innovations in art, society and technty. A strong city partnership in Greater Manchester enables them to work closely with Cities and to participate in EU projects such as CitySDK, Euporias, Apps4Europe and ECAS.


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# FOREWORD

***This report is like an open window looking out onto a wholly new, and largely unexplored, world. The emerging applications that we globally call "digital social innovations" are fascinating examples of how humans can find new ways to collaborate in amazing manners, overcoming geographical, cultural and social barriers, and reinventing the way society can thrive in a world with ever decreasing availability of natural resources.***

***There is only one natural resource that is now available in larger amounts than in the past: humans. Connecting them, in novel, pervasive, widespread and affordable manners, is perhaps the biggest breakthrough enabled by digital technologies.***

***Several names have been given to this: network effects, collective intelligence, hyperconnected societies. This hyperconnectivity is generating a new currency, more sustainable and ethical than money: data – open data. Open data increases awareness and coordination, creates new opportunities for innovation, and strengthens inclusion, participation and, ultimately, human well-being.***

***Society, economy, and even human psychology itself are undergoing an irreversible change, which we as citizens and policymakers are still struggling to understand. This understanding is key to anticipating possible developments, while at the same time to maximising the positive impacts on society, as well as averting the risks of misuses that inevitably accompany any step of human evolution.***

***I am thankful to the authors for this startling journey into a nascent field, and I am confident that this will help us all to understand how best to enable the emergence of new models for a more resilient and sustainable society.***

**Fabrizio Sestini**

**European Commission DG CONNECT**

**Advisor (Senior Expert) Digital Social Innovation**

# EXECUTIVE SUMMARY

**Digital technologies and the Internet have transformed many areas of business – from Google and Amazon to Airbnb and Kickstarter. Huge sums of public money have supported digital innovation in business, as well as in fields ranging from the military to espionage. But there has been much less systematic support for innovations that use digital technology to address social challenges.**

Digital technologies are particularly well suited to helping civic action: mobilising large communities, sharing resources and spreading power. A growing movement of tech entrepreneurs and innovators in civil society are now developing inspiring digital solutions to social challenges. These range from social networks for those living with chronic health conditions, to online platforms for citizen participation in policymaking, to using open data to create more transparency around public spending. We call this Digital Social Innovation (DSI).

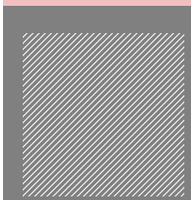
Over the last 18 months Nesta, funded by the European Commission, has led a large research project into DSI. The project seeks to define and understand the potential of DSI, to map the digital social innovators, their projects and networks, and to develop recommendations for how policymakers, from the EU to city level, can make the most of DSI.

## Main findings

### What is it?

Our study of more than 130 in-depth global examples of DSI showed the diversity of the field, but also that many innovations can be understood as manifestations of four main technological trends:

- **Open Hardware**
- **Open Networks**
- **Open Data and**
- **Open Knowledge**

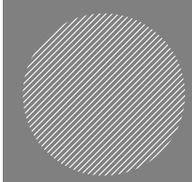


**Open hardware:** These projects are inspired by the global do-it-yourself maker movement and the spread of maker spaces. They make digital hardware available for people to adapt, hack and shape into tools for social change.

Safecast, a project that enables citizens to capture and share measurement on radiation levels, is one example of the potential of open hardware. It was founded in March 2011 as a response to the accident at the Fukushima Daiichi nuclear power plant in Japan and frustration over the lack of government transparency about local radiation levels. Using the Arduino, an open hardware circuit board with a microprocessor, Safecast built their own Geiger counters. These were given to local volunteers who used them to create large open datasets on radiation levels in Japan. All data is plotted on a map that visualises radiation levels in a given geographical area, and which is free for anyone to access. To date, Safecast has captured more than 15 million data points.

**Open knowledge:** This refers to large groups of citizens coming together through online platforms to collectively create and analyse new types of knowledge or crowdfund social projects. This is the part of digital social innovation where we see the most activity, from participatory democracy platforms such as FixMyStreet that enable citizens to crowdmap local issues like potholes and broken streetlights, to co-writing legislation and e-petitioning on ideas for how to improve society.

One example of the potential in mobilising citizens to create collective knowledge is the work done by Cancer Research UK on their citizen science platform Cellslider. To date Cellslider has involved more than 200,000 volunteers in analysing around two million cancer images. Other examples include how the Open Ministry (now part of the D-CENT project) has involved more than 250,000 Finns in co-writing and voting on citizen-led policy proposals, five of which have been put to a vote in the Finnish parliament.



**Open data:** This refers to innovative ways of opening up, capturing, using, analysing and interpreting data.

OpenCorporates (OC) provides a good example of the opportunities in open data. It was set up to in the wake of the financial crisis to make information about companies and the corporate world more transparent and accessible. It has since grown to become the largest open database of companies in the world, including data on 60 million companies and their subsidiaries, and searchable maps and visualisations. OC is widely used by journalists and governments seeking to understand global corporate structures.

Another example of this potential is how the city of Vienna, in Austria, has opened up more than 160 datasets on everything from budgeting to planning information. This has led local developers to create more than 109 open data-based apps for the city and its residents.

**Open Networks:** The fourth trend describes how citizens are developing new networks and infrastructures – e.g. sensor networks – where they connect their devices, such as phones and Internet modems, to collectively share resources and solve problems.

One example of this is Guifi.net, which was founded in 2000 as a response to the lack of broadband Internet in rural Catalonia, where commercial Internet providers weren't providing a connection. The idea was to build a 'mesh network' where each person in the network used a small radio transmitter that functioned like a wireless router to become a node in the Guifi net. With more than 23,000 nodes, Guifi.net is the largest mesh network in the world and provides Internet connection to those who would otherwise not be able to access it.

## Who are the digital social innovators?

The people and organisations working on digital social innovation may not identify themselves as social innovators, and they are often in very different communities to those who traditionally work on social innovation, such as established charities and social enterprises. We've tried to explore who the people and organisations working on DSI are, what their projects look like and how the networks of digital social innovators are connected, as well as where there are gaps in the network, in order to devise new strategies to support and scale the ecosystem.

Through crowdmapping organisations on www.digitalsocial.eu, we have mapped 1000 organisations with 630 collaborative DSI projects as of January 2015. In terms of the areas of society that the DSI projects focus on, the majority focused on **education and skills** (254) and developing **new models for participation and democracy** (251), with least activity around DSI **science and technology** projects (110) and DSI **finance and economy solutions**, such as crowdfunding for social good projects (104).

The **network analysis** shows that although there are few very active organisations, most are disconnected from these stronger networks. Well connected 'hubs', including Waag Society, Nesta, Fondazione Mondo Digitale and the Institute for Network Cultures, have many connections. 26 per cent of organisations (243) have connections to at least one other organisation, with the average number of connections per organisation being almost three.

## The challenges for the EU

The big challenges for the EU are how to make it easier for small-scale radical innovations involving digital technology to emerge and evolve, but perhaps more important **how to create the conditions for the really powerful ones to get to scale**. One of the key issues for the further growth of DSI in Europe is how to better connect the many very young and small-scale organisations and innovative projects in Europe to collaboratively develop projects, share learning and best practice, and seek funding and sustainable new business models.

This research has identified the goals of policy, the policy tools and funding instrumemts available and **the frameworks and open standards to make it much easier for digital social innovations to spread.** The study also indicated some examples of how these actions could be implemented within the framework of the Digital Agenda for Europe and under the Horizons 2020 Work Programme.

As shown in this research, Europe has pioneered a reasonably comprehensive set of tools (also through research programmes such as CAPS), and policy actions. But the scale of innovation is still far too modest relative to the scale of the challenges. And some of the biggest barriers to impact lie in the entrenched power of incumbents who, not surprisingly, would prefer digital social innovation to remain the domain of geeks, hackers and activists.

The Commission must create the conditions where digital businesses, social entrepreneurs and DSI communities can thrive. This includes several actions:

1) Experiment with bold public and social innovations

2) Invest in the infrastructure of the 21st Century, in order to provide a privacy-aware decentralised environment for open data;

3) Educate a technology-savvy multidisciplinary workforce, and use all their powers to foster a culture of democratic and inclusive innovation.

Only by improving its social innovation capacity can Europe remain productive and competitive, and create the digital innovations for the social good that its citizens need.

## What should policymakers do?

To support digital social innovation, policymakers from city to government and EU level should focus on the following five key areas.

**1. Invest in digital technologies for the social good:** Make it easier to create new Digital Social Innovation through specific regulatory and funding measures that focus on supporting non-institutional actors driving innovation in the following areas: the collaborative economy, cities and public services; open tools and distributed architectures; and citizen engagement and direct democracy.

**2. Make it easier to grow and spread DSI through public procurement:** Provide support for evidence generation, common standards and integration with public services. Focus on the financial as well as the social impact (such as health outcomes, wellbeing etc.) when procuring services. Particularly for DSI this could include valuing the network effect and digital engagement of users provided by procured services.

**3. Expand the European DSI network and invest in the development of skills, and training:** This could be done through growing the digitalsocial.eu network to enable more opportunities for collaboration; increasing early stage seed-funding programmes and other types of non-financial support for DSI start-ups; supporting programmes that help people and organisations working on social innovation develop their digital skills; and building DSI capacity in Eastern Europe by facilitating collaboration between established DSI networks and organisations from the rest of the EU.

# INTRODUCTION

There is a possible future in which services are explicitly designed to tackle societal challenges such as climate change and unemployment. This research project has identified, mapped and engaged communities that are constructing the emerging Digital Social Innovation (DSI) field and provides policy recommendations to foster, support, and scale DSI in Europe. We believe this research comes at a crucial time – a range of new online services are being developed just as there is renewed interest from citizens across Europe in solving social and economic challenges.

The Internet is approximately 40 years old, and its capacity for generating societal and economic value is relatively well understood, yet its potential for solving large-scale social challenges remains largely untapped. The last 20 years or so have seen the commercialisation of the world wide web take precedence over its possible uses for the social good, even though the web itself was founded at CERN to further a vision of scientific knowledge sharing. While massive commercial investment and business models fuelled the web's incredible growth, the use of platforms like Facebook to serve social good has been accidental, disputed and secondary to their primary commercial purpose.

A contradiction, therefore, exists at the heart of the Internet. Despite the existence of a technical networking layer that could spread power and give people more 'bottom-up' political and economic control over their lives, the existing commercial services built on top of this lower technical layer continues for the most part to empower existing 'top-down' centralised and established organisations in the corporate and government sector. It also often neglects smaller and possibly game-changing innovative services aimed at tackling large-scale societal challenges.

Online innovation developed specifically to effect major positive social change remains, arguably, in its infancy, with relatively few services reaching global scale. There are a few impressive success stories in obtaining a global reach, in particular campaigning sites such as Avaaz and parts of the collaborative economy and the maker movement. Yet services that exist to help communities collaborate on problems that may not fit in traditional institutional or commercial models are still underexplored and badly supported.

## What is innovation?

The nature of innovation has changed dramatically over the past decade. Innovation is no longer seen as a linear step-by-step process in which R&D activities or technology pushes automatically lead to the commercialisation of new products, but rather as a collective and cumulative process that builds on past knowledge. Some innovations involve big discontinuities, such as 'radical' or 'disruptive' innovations, and others involve continuous small improvements, such as more 'incremental' innovations. Finally, innovation is a risky and uncertain process; the rate of failure is usually very high, and its impact can be difficult to measure, particularly outside of the private sector.

**A new field of DSI has emerged very quickly. It points to radically new ways of organising many of the essentials of life – from money and health to democracy and education. Its forms are still emergent, some growing very fast, others still being quite marginal. It has been almost entirely invisible to policymakers and has had none of the extensive support that has gone into digital technologies for the military, government and business.**
**But it has the potential to contribute to three of the most important challenges facing Europe: reinventing public services, often in less costly ways; reinventing community, and how people collaborate together; and reinventing business in ways that are better aligned with human needs.**

In the context of this research we define DSI as

***'a type of social and collaborative innovation in which innovators, users and communities collaborate using digital technologies to co-create knowledge and solutions for a wide range of social needs and at a scale and speed that was unimaginable before the rise of the Internet'.***

There is great potential to exploit digital network effects, in social innovation activity and new services that generate social value, but much of this potential has not yet being realised. The goal is to enable more of these smaller innovative services to sprout and flourish and effectively help to solve global scale societal problems.

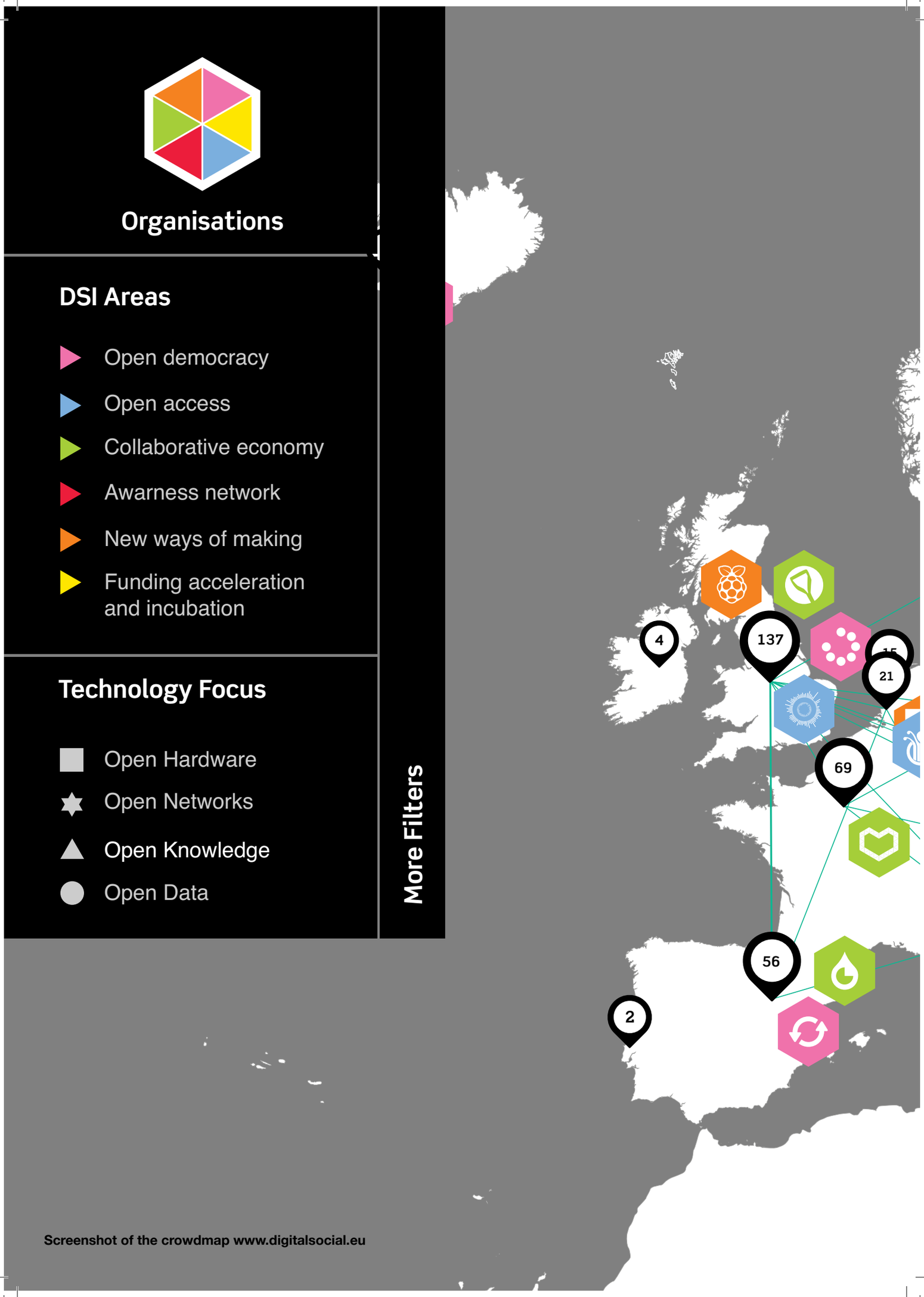
In light of these transformations, there is the need to rethink policies and instruments designed to nurture and orchestrate this innovation.

We present in this report the main insights from this research, including:

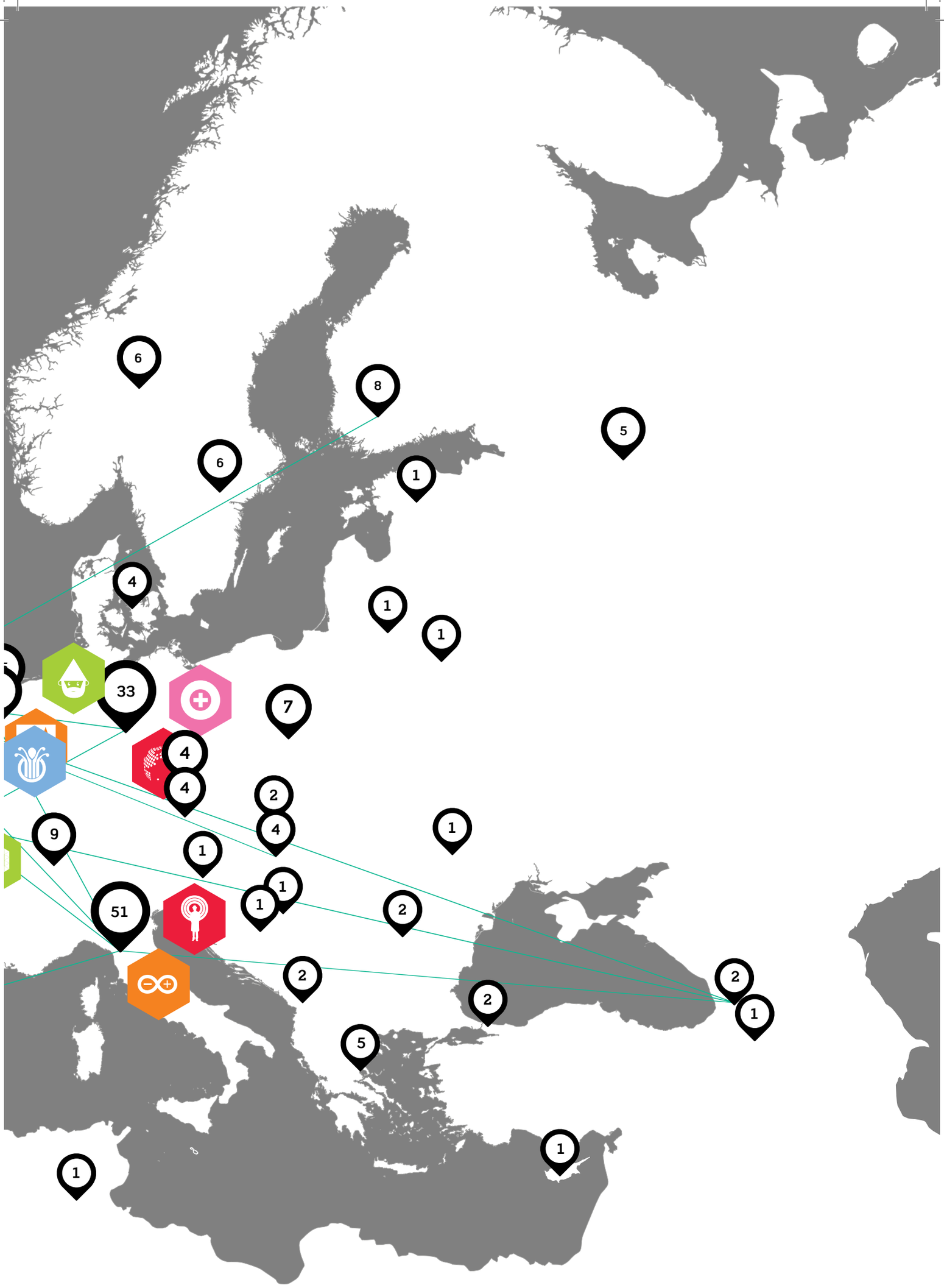
- **Defining the DSI Ecosystem:** An emerging understanding of what social innovation enabled by digital technologies is. This includes the types of technologies underpinning DSI services. These combine novel technology trends such as open data, open hardware, open networks, and open knowledge; and they give rise to new DSI areas such as: (1) open access; (2) awareness networks; (3) collaborative economy; (4) new ways of making; (5) open democracy; and (6) acceleration and incubation. **Crowdmapping DSI organisations and their activities:** 1000 organisations working on DSI in Europe have been mapped, 630 projects (as of January 2015) were identified and the way they are connected was analysed, including a network analysis of the links between organisations.

- **Co-designing policies for DSI:** Policy recommendations for DSI that can be implemented at a different level of governance are outlined. This includes mechanisms to foster DSI, regulation, policy tools and financial instruments to nourish and grow bottom-up innovation for social good.

- **Evaluation:** A variety of methodologies to evaluate the impact of DSI are discussed. Digital social innovations need to demonstrate their impact to make the case for spreading, scaling and attracting funding opportunities. Equally, as DSI evolves policymakers need to understand the extent to which the policies they are putting in place to support DSI are affective




Screenshot of the crowdmap www.digitalsocial.eu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# 1

# WHY IS DIGITAL SOCIAL INNOVATION IMPORTANT?

***1.1***

***Project overview***

***1.2***

***Harnessing Collective Intelligence for the social good***

***1.3***

***Digital Social Innovation in the context of Future Internet in Europe***

# 1.1 PROJECT OVERVIEW

**This research aims to explore the potential of digital tools that can effectively empower citizens, communities and social entrepreneurs to solve societal problems.**

In particular, we examine how some of these digital services can take advantage of **the network effect of the Internet** (i.e. that the benefit of a network and its critical mass of users grows larger than its costs), as the Internet is increasingly the technical underpinning of the sociotechnical fabric of our societies.

We want to distinguish between two levels: 1) **the level of the technical networking infrastructure** itself provided by the Internet and 2) **the level of online services built on top of these networks**. Metcalfe's Law, (i.e. that the value of the network is in proportion to the number of members squared, so that the value of the network goes up for all users when more users are added)[1] applies to the value of technical networks like widespread smartphone usage.

For example, despite the Internet being a military-funded research project and the web a scientific project at their inceptions, the Internet and web were based on open standards and a radically decentralised architecture that could be harnessed by any actor. So the Web was able to reach a critical mass of connectivity so that both commercial entities (like Google) and non-commercial entities (like Wikipedia) were able to exploit the "network effect." Beyond the Internet, many new technologies such as open hardware may have positive network externalities.

This network effect applies in a straightforward manner for some services such as social networking sites like Facebook, and sites that require large user-bases like Wikipedia or Airbnb, but it may not apply easily to some other services such as e-democracy platforms, caring networks and local currencies**. For each kind of socially innovative service, we want to determine how they can maximise their impact using the infrastructure made available by the widespread usage of digital tools such as the Internet.**

## Examples of Digital Social Innovations

There are many cases of DSI being spread throughout society and we attempt to define and cluster these in this report. They include: the **collaborative economy, local exchange and trading systems, digital currencies, and awareness networks** that incentivise experimentation with new models in a variety of domains. For example, **systems of mobility** that present alternatives to the use of individual cars (from car sharing and carpooling to bike sharing); **collaborative consumption** (including product service systems, redistribution markets and collaborative lifestyle platforms); citizen science, where the crowdsourcing of scientific data allows for some scientific research to be conducted by non-professional scientists; **new ways of making** that are experimented with in innovation hubs, such as Fab Labs, hackerspaces, living labs, urban labs and the HUB; and collaborative events such as barcamps, hackmeetings, open knowledge festivals and maker fairs.

## 1.2 HARNESSING COLLECTIVE INTELLIGENCE FOR THE SOCIAL GOOD

The rapid evolution of digital technologies and networks has made the ability to orchestrate knowledge and to manage creative interactions a central issue of economic and social policy. Understanding more about how collective intelligence happens, and devising and implementing effective tools for fostering it, should be a major project for Europe in the next decade. [2]

However, we need to define the kind of intelligence that is necessary to try to tackle these large-scale societal problems.[3]

In the context of digital social innovation we stress the potential of collective intelligence as:

**a self-sustaining, self-directed integrated and distributed cognitive system that involves both other humans and technology to successfully solve problems beyond the cognitive capacities of any individual outside of the larger system.**

Collective intelligence is required because some problems require collective coordinated action that individuals cannot accomplish by themselves. Collective intelligence is not new - almost any team or wider social system requires a level of coordination and acts intelligently in a way that goes beyond each of its members. By allowing new forms of communication, collective memory and algorithmically mediated attention, the Internet forms a natural digital substrate for collective intelligence.

Looking forward, collective intelligence is necessary for social innovation to tackle the problems facing society in today's complex and interconnected world, where grasping problems such as the financial crisis, climate change, and the demand for quality healthcare, seem to require digitally-extended collective intelligence, such as collectively tackling problems via platforms based on crowdsourcing and cognitive mapping based on real-time data analysis and visualisation.

There have been lots of attempts to harness collective intelligence to address social issues, such as climate change. In this report we identify some key initiatives such as Safecast and Smart Citizen Kit that operate in this way. However, to date these attempts have either been connected to a specific event which has not been sustained over time, or they operate at a relatively small scale. As a result they often they fail to lead to development of new solutions or systemic behavioural changes.

A potential future scenario to tackle climate change using collective intelligence could be the large-scale crowdsourcing of environmental data, where people collectively identify their own high-carbon intensive behaviour, then brainstorm and implement the changes necessary to reduce emissions and change behaviour.

Today new forms of social innovation are needed to create synergies between the social and the technical, which create new forms of value that are not limited to economic value, but that result in large-scale social impact. At the present moment, the Internet offers unprecedented opportunities for collective intelligence via its increasing ubiquity and the massive amounts of data available for collective transformation into knowledge.

# 1.3 DIGITAL SOCIAL INNOVATION IN THE CONTEXT OF FUTURE INTERNET IN EUROPE

This research forms part of the European Commission's thinking around its **Europe 2020 strategy** and the **European Digital Agenda**. Its ambition is to inform the development of better support, regulation and policy, as well as to help define potential funding programmes from 2015 onwards. Europe 2020 strategy is broad and ambitious and it is likely that an "out-of-the-box" strategy reliant on harnessing DSI would help to meet the Europe 2020 goals.

The evidence gathered here enables us to recommend how best to combine research, strategy, and policy for DSI in relation to the Digital Agenda for Europe and under the Horizon 2020 Work Programme, and in particular, but not limited to, the **Collective Awareness Platforms (CAPS) Programme.**

We are undergoing a transformation that involves society and the economy, driven by the fast evolution of ICT. More than five billion additional people will connect to the Internet globally in the next ten years, whilst over twenty billion objects will be connected to the Internet, transmitting data coming from people, sensors, the environment and objects themselves. However, we cannot expect the Internet **by itself** to drive innovation to help citizens address major societal challenges.

If we observe the Internet during its early phases when it was primarily funded by research and defense, its founding principles, such as **network neutrality, equitable service, and peer-to-peer architecture,** were crucial to build **a universal, open and distributed infrastructure** (avoiding points of centralisation by design, with the notable exception of the domain name system) that allowed the emergence of creativity and bottom-up innovation.

To a large extent these founding principles still exist. **On the network level**, there is still an ongoing defence of network neutrality. **On the level of platforms** for client operating systems such as Windows and Android, open standards have fostered innovation by allowing technologies like web browsers to be implemented over different underlying platforms, avoiding proprietary systems and vendor lock-in on the web. This was a hard and contested battle, which turned out to be the best way to do things, even commercially.

Yet **on the level of services**, the emerging cloud model of some services (proprietary social networks, big data providers, implementations of the Internet of Things), is convenient for users but also "locks users in" at the expense of security, privacy and openness: protocols are often proprietary, the systems are centralised (particularly in terms of ownership and decision processes) and interoperability between systems is not a requirement.

This centralised model prevents new and small companies from building innovative applications, as their applications need access to social data held on third-party sites and permissions to get into proprietary 'app stores.' The lack of standards forces developers to create multiple versions of the same social application for different closed platforms and hampers bottom-up disruptive innovation to happen.
**A main Internet trend-threat is recognised today: an increasing concentration of power in services in the hands of a few data aggregators, none of which are based in Europe** (Google controlling nearly 82% of the global search market and 98% of the mobile search market, Facebook dominating the social networking and identity ecosystem, while Apple, Amazon and Microsoft control the mobile market and cloud-based services platforms).

Apple has started a market that was entirely new; Google has developed the open source Android operating system and spawned innovation in applications worldwide; Facebook has enabled the building of thousands of apps and helped people to connect and organise. However, one danger is that firms capture collective intelligence via proprietary lock-ins, monopolistic behaviour and aggressive IP litigation rather than providing actual innovative services. Thus, there is a danger that once users are 'locked in' to various monopolies, the level of innovation in these services will decrease. Furthermore, **most users have accepted giving away their personal data in exchange for "free" services. Yet this bargain not only undermines privacy and weakens data protection but also commodifies knowledge, identity and personal data.**

There are other models that focus on innovation. As we discover in this research, while the value of big data is often only associated with efficiency and profitability, big data can also be used for social good, to improve public services and stimulate inclusive innovation.

**The world wide web became successful because it was built on a set of royalty-free open standards decided through an inclusive and transparent process, via standards bodies such as the IETF and W3C, continuing to this day.**

**Big Data can also be used for social good, to improve public services and stimulate inclusive innovation.**

**Europe could provide an alternative model in the form of investment in open infrastructures on the network, service and data layer. We emphasize the importance of building European public, distributed, privacy-aware architectures that can provide the underlying open digital ecosystem on top of which innovations for the social good can flourish.**

European SMEs, developers and social entrepreneurs are innovating with cheap open hardware, open source software, open knowledge, data storage and analytics and are producing valuable data about people, the environment and biometric and sensor data. The amount of data produced by open platforms and used for social innovation is still dwarfed by the amount of data collected on proprietary platforms, with the danger that much of this data is not available for the social good. For example, even the European Smart Cities project risks being dominated by US companies such as IBM, Google and Ciscos, partly because of the lack of alternatives.

Take for example the commercial success of Google: Google has already built one of the world's largest networks of computers and data centres for online-search results, and can repurpose their technology in order to expand into other data-driven services in order to increase their value, profit and marketability. For example, the company is now pushing into smart watches, smart cars, smart thermostats, smart clothes and smart cities. Their computing power can now then be used to store and analyse medical information, sensor and environmental data, which raises significant issues of privacy and competition.

Right now few of these opportunities are being taken advantage of by European social innovators, for the most part due to a lack of an open infrastructure and difficulty finding investment.

The future of the Internet should remain pluralistic, so that there is space for DSI alongside commercial services in the Cloud. In the long-term, if only a few non-European commercial bodies control all data-driven services, this threatens the ability of the European innovation system to compete

This European infrastructure would enable a whole new round of innovation that may not even be possible within current business models, with new players evolving, shaping and structuring whole new markets and societal institutions that can maximise social value and innovation.

**The challenge for Europe is how it might acquire the competitive advantage in social innovation** by developing distributed innovation ecosystems, rather than 'winner takes all' marketplaces whose dominant players set the terms of innovation and competition. (Bria 2012)

One of the motivations underpinning this research is investigating how Europe can embrace participatory and collaborative innovation models and experiments[5] and promote policy tools and actions that support the growth of digital technologies for the social good.

**Digital social innovation could play a central role in the development of the Future Internet and the Internet of Things.**

## POWER TO THE PEOPLE

**Wikis,**
**Usergenerated knowledge**
**P2P**
**Free Content Blogs**
**Social Networks**
**E-democracy**

**INTERNET**

## BIG BROTHER

**Commercial services,**
**Entertainment (eg. IPTV)**
**DRM-heavy**
**apolitical**

◀ PEOPLE
SOCIETY
COLLABORATION

▲ DISTRIBUTED

INDIVIDUALISM ▶
BUSINESS
COMPETITION

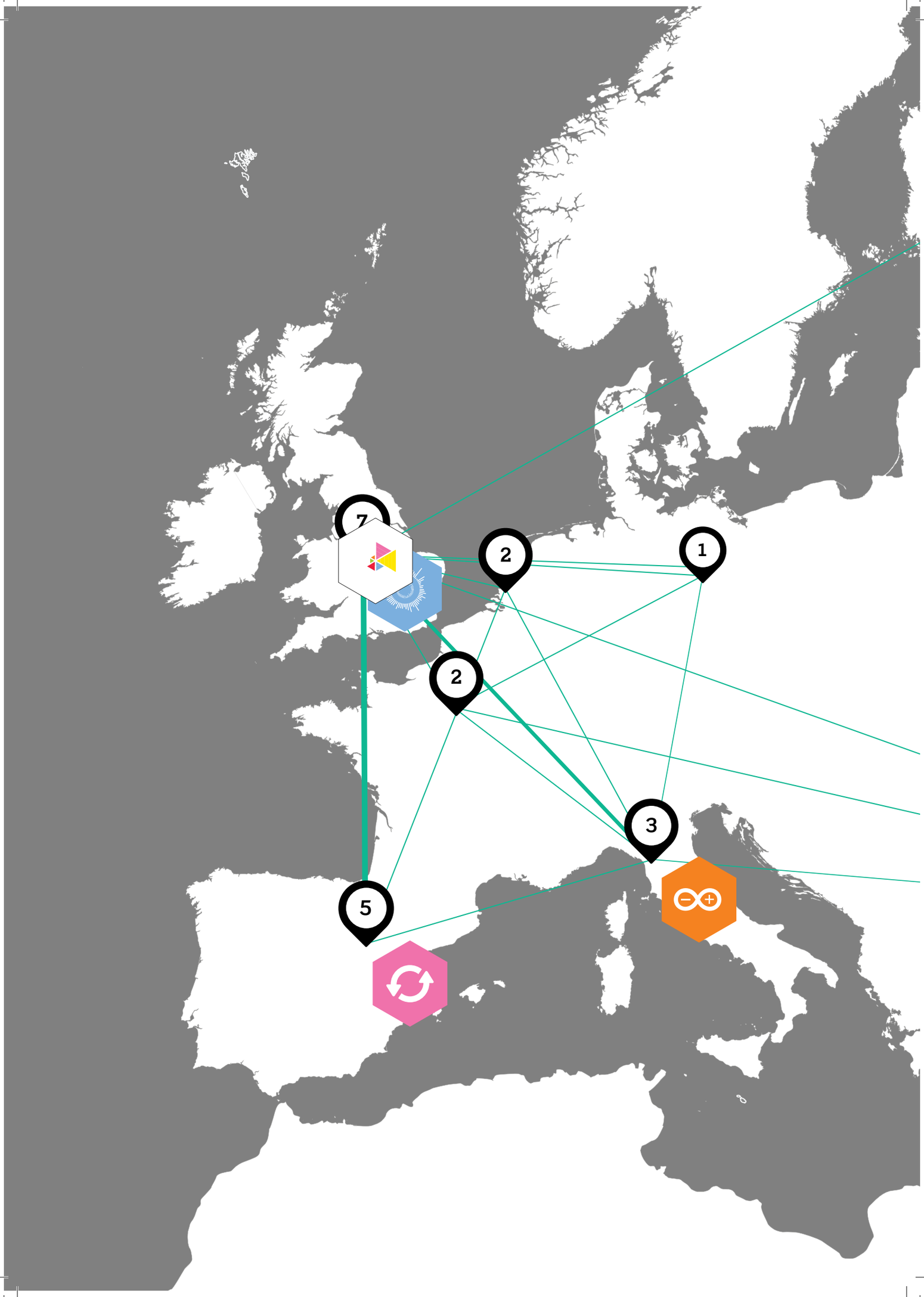
CENTRALLY ▼
CONTROLLED

### Open and distributed digital ecosystems to foster grassroots social innovation and entrepreneurship.

The alternative is to accelerate innovations that align the capacities of the Internet better to social needs and that decentralise power to citizens and communities. The development of open data, federated identity, bottom-up wireless and sensor networks, open hardware and distributed social networks can potentially serve collective action and awareness. Making data available as part of a common distributed and decentralised architecture, open to all, allow new entrants to aggregate data on demand and create new services. Competition based on open standards, protocols and formats are essential to deploy interoperability between data, devices, services and networks. This vision requires more investment in fundamental research to promote net-neutrality, strong encryption, banning of trivial patents, open standards and free software together with the multi-stakeholder governance model. Avoiding anti-competitive dynamics and lock-in would engage all particapents in the value chain and allow for a replicable and sustainable solution. It would also enable new economic models, including those beyond GDP and commons-based, as alternatives to the centralised models of the current dominant global platforms that often monetise and sell personal data

### Creation and consolidation of new monopolies: Platform Lock-ins and a battle amongst proprietary vertically integrated digital ecosystems:

A major risk for the Future Internet is the realisation of the 'Big Brother' scenario, with big industrial players (mainly US-based) reinforcing their dominant position by implementing platform lock-in strategies, enforcing extensions of copyright and patents, appropriating users' data and discriminating network traffic. By centralising computing, data storage and service provision (via the Cloud), and by striking strategic alliances between the largest Over-The-Top (OTT)iand largest network operators, there is a risk that the innovation ecosystem will become more closed, favouring incumbents and dominant players, thereby in time constraining user-driven innovations, particularly ones that don't involve monetary payment. This currently seems the most probable scenario, since we are seeing a consolidation of existing powers at every layer of the Internet ecosystem. Even more worrying, the latest NSA data-gate showed that intelligence agencies and governments have been engaging in mass surveillance operations, with huge implication on civil liberties and privacy.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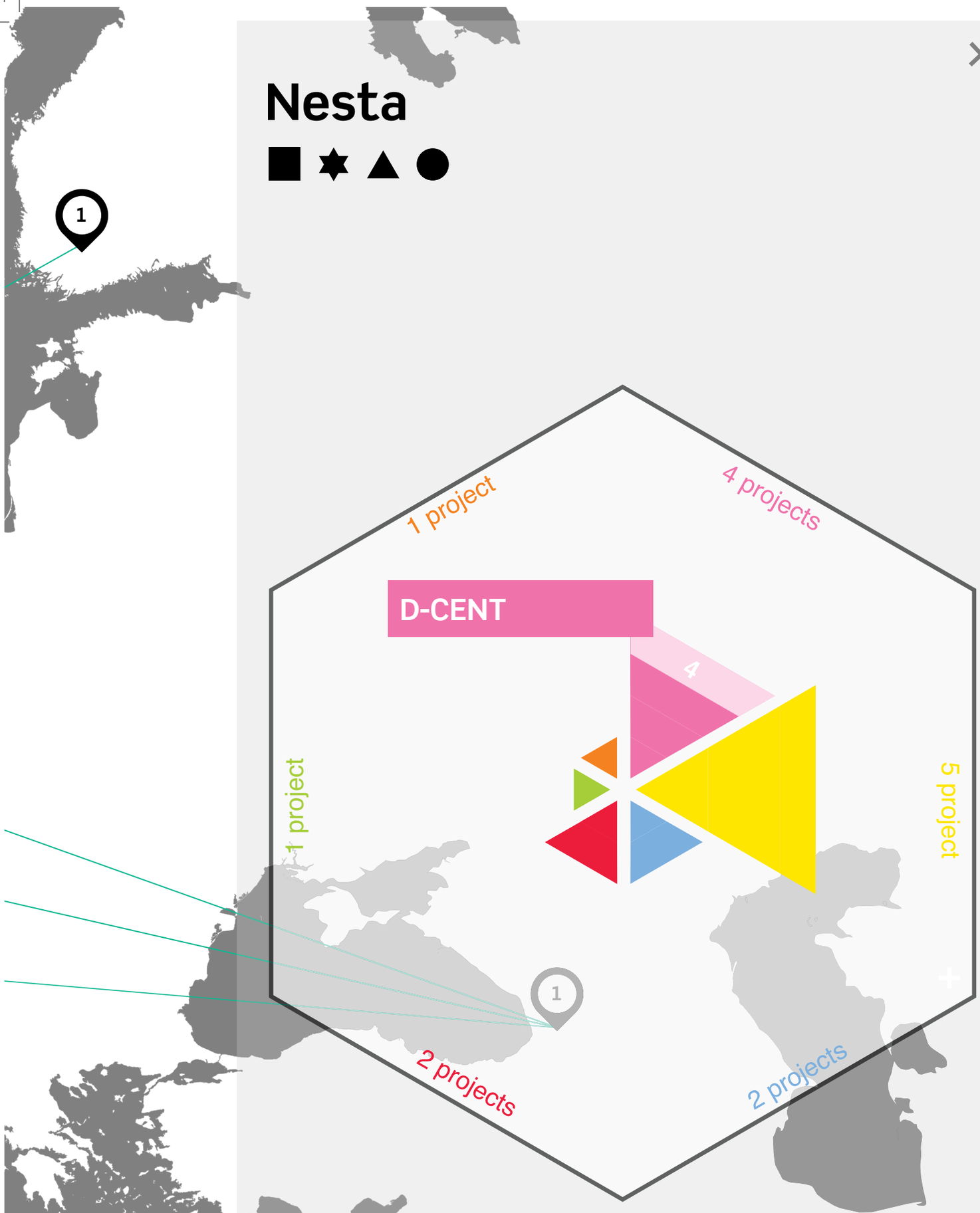



More details...

# 2

# MAPPING THE DSI ECOSYSTEM


***2.1***

***DSI Ecosystem: An emerging typology of the DSI field***

***2.2***

***Domains of DSI***

***2.3***

***Who are the organisations involved in supporting or delivering DSI?***

***2.4***

***Technological trends in Digital Social Innovation***

## 2.1 DSI ECOSYSTEM: AN EMERGING TYPOLOGY OF THE DSI FIELD

Digital Social Innovation is a relatively new field of study, with little existing knowledge on who the digital social innovators are, what types of activities they are involved in and how they are using digital tools to achieve a social impact. Therefore, the first task for this study was to take a 'deep dive' into practice and to look in more detail at the different types of organisations involved with DSI and the activities these organisations are involved in.

The overarching purpose of this chapter is to give an overview of the lessons we have derived from the case studies and how we have used that to map the DSI field.

The analysis of practice enabled us to develop the framework, which has been used to capture data on DSI organisation via www.digitalsocial.eu. We have mapped 1000 DSI organisations and 630 collaborative projects as of January 2015. Data is categorised by:

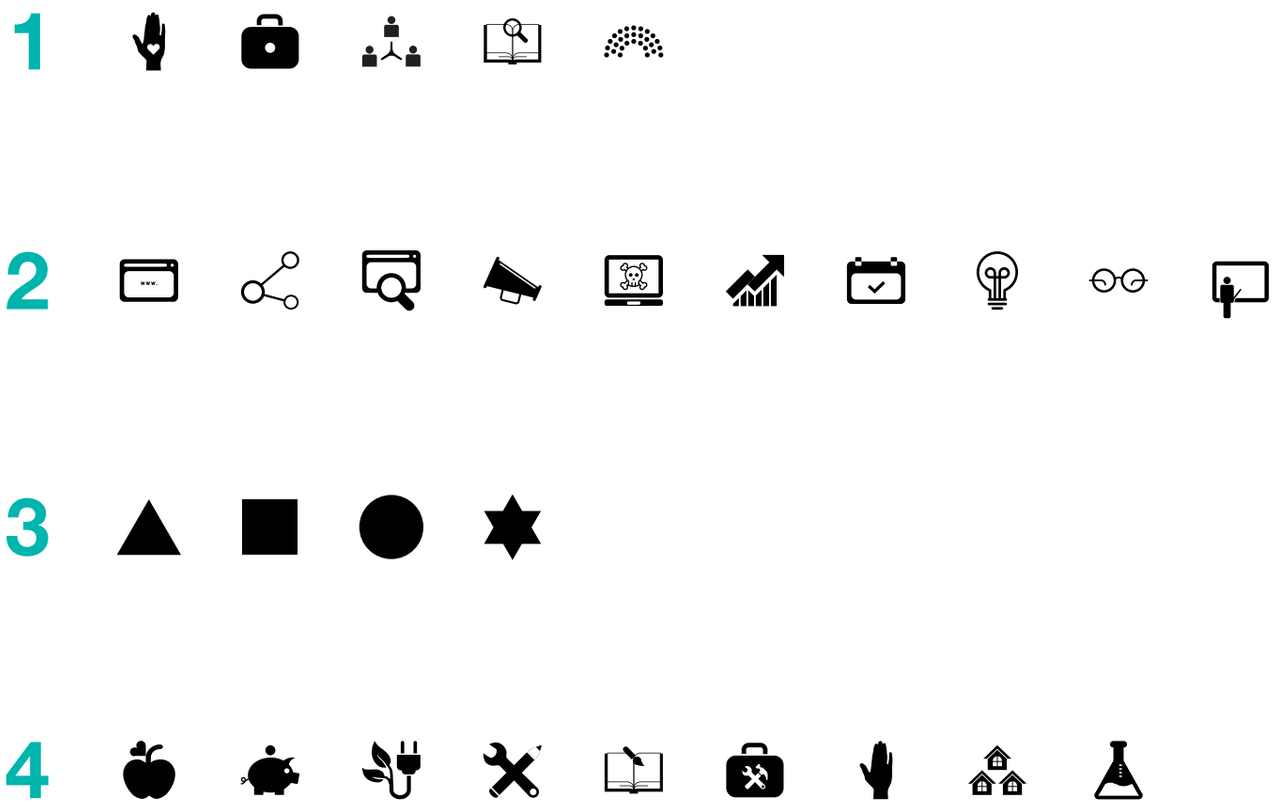
**1. A typology of organisations** (e.g. government and public sector organisations, businesses, academia and research organisations, social enterprises, charities and foundations and grassroots communities)

**2. The way these organisations are supporting DSI** (for instance, by undertaking research, delivering a service or organising networking events and festivals)

**3. The main technological trends** the organisations and their activities fit under (e.g. open data, open networks, open knowledge, open hardware)

**4. The area of society the organisations and their activities operate and seek an impact in.** The DSI field does not have fixed boundaries; it cuts across all sectors (the public sector, private sector, third sector and social movements) and cuts across domains as diverse as (1) health, wellbeing and inclusion, (2) innovative socio-economic models, (3) energy and environment, (4) participation and open governance, (5) science, culture and education and (6) public services.

**DSI Icons:** **1** Organisation Type: Social Enterprise Charity or Foundation, Business, Grass Roots Organization or Community Network, Academia and Research, Government and Public Sector. **2** Project Type: Delivering a web service, Network, Research project, Research project, Advocating and campaigning, Maker and hacker spaces, Investing and Funding, Event, Incubators and Accelerators, Advisory or expert body, Education And Training. **3** Technology Trends: Open Knowledge, Open Hardware, Open Data, Open Network. **4** Areas of Society: Health and Wellbeing, Finance and Economy, Energy and Environment, Education and Skills, Culture and Arts, Work and Employment, Participation and Democracy, Neighbourhood Regeneration, Science.



## 2.2 DOMAINS OF DSI

The organisations and projects identified to date can roughly be grouped within six broad domains. A provisional **thematic clustering of DSI** organisations is emerging, grouping activities into **6 macro clusters** that capture the way DSI is growing and developing: **(1) New ways of making, (2) Open democracy, (3) The collaborative economy, (4) Awareness networks** enabling sustainable behaviours and lifestyles, **(5) Open Access and (6) funding, acceleration and incubation.**

**Hexegan schematic of the 6 areas of DSI**

## COLLABORATIVE ECONOMY

***New collaborative socio-economic models that present novel characteristics, and enable people to share skills, knowledge, food, clothes, housing and so on. It includes crypto digital currencies, new forms of crowdfunding and financing, new platforms for exchanges and sharing resources based on reputation and trust.***

The collaborative economy – and the many other umbrella terms used to describe the rise of digital marketplaces for people to make transactions and share skills, assets and money – is fast becoming a key economic trend. Access to open digital infrastructures and technologies, that enable collective action, mobilisation and self-organisation at a large scale, has led to the emergence of new collaborative socio-economic models that present novel characteristics and enable people to share skills, knowledge, food, clothes, housing and so on. The Collaborative Economy has been documented by organisations like the △ **P2P Foundation**, Nesta, and △ **OuiShare**.

Across the world the burgeoning field of **collaborative consumption** is using digital platforms to change how people share resources and exchange goods and services, which range from household equipment to hotel rooms, cars to catering. In the UK, Nesta research documented how 25% of UK adults used Internet technologies to share assets and resources in 2013 – 2014[6].

An example, which grew out of the desire to reduce consumerism and connect neighbours, is △ **Peerby**, which started in the Netherlands. Peerby enables you to borrow the things you need from people in your neighbourhood. It is now setting up branches in the UK and USA.

△ OuiShare

SHARING ECONOMY NETWORK

OuiShare is a global collaborative consumption network founded in January 2012. The overarching aim of OuiShare is to shift the focus of the economy to one that can find new ways to connect, create and share on the web. It achieves this through two primary activities, Ouishare.net and collaborative economy events. Ouishare.net is an online community where members can post articles on collaborative consumption and anyone interested in the subject can take part in online conversations. In Europe alone, OuiShare organised 32 events in 2014 across 16 European countries, which engaged more than 2000 entrepreneurs. In addition to this the OuiShare Festival is an annual event, which brings together the global collaborative economy community. The 2014 event took place in Paris and brought together more than 1000 people working on, or interested in, the collaborative economy.

In parallel thousands of **alternative currencies** are in use – some focused on localities (e.g. the Brixton Pound in the UK or Chiemgauer in Germany); some on business-to-business transactions (e.g. the SoNantes in Nantes and Sol-violette in Toulouse, France, or Sardex in Sardegna, Italy, and the Sucre in Venezuela); some on particular sectors such as care (e.g. Fureai Kippu in Japan); and some as generic digital currencies (e.g. Bitcoin)[7]. Some of these have deliberately encouraged a changed awareness of how economies work – for example, valorising labour time equally, or linking currencies to data. In East Africa the development of **M-PESA** (a mobile financial payment system born out of social innovation) has become an avenue for nine million people to gain access to secured financial exchange services. This African success story has completely revolutionised the regional business terrain, at the same time empowering local people by providing an easy-to-use and readily available banking service that hitherto was impossible to access because of poor banking infrastructure and a strict regulatory framework.

## △ Goteo

SHARING ECONOMY NETWORK

Other interesting initiatives such as Goteo are building services around the idea of the Commons, to enable communities to access and share resources to collaborate on social projects. Goteo is a social network for crowdfunding and distributed collaboration (services, infrastructure, micro tasks and other resources) for encouraging the independent development of creative initiatives that contribute to the common good, free knowledge and open code. Goteo is managed by the non-profit Open Sources Foundation that supports projects that offer some kind of collective return, such as the open source DIY shoest kit[8], a project developed with the support of Fablab Barcelona, or http://tuderechoasaber.es, a service that allows citizens to send open data information requests to Spanish public bodies.

# NEW WAYS OF MAKING

***An ecosystem of makers is revolutionising open design and manufacturing. 3D manufacturing tools, free CAD/CAM software and open source designs are now giving innovators better access to tools, products, skills and capabilities they need to enhance collaborative making.***

**A vibrant ecosystem of makers is developing across Europe and globally. Low-cost home 3D manufacturing tools (3D printers, CNC – computer numeric control – machines), free CAD/CAM software, like Blender, 123D or Sketchup, and open source designs are now giving innovators better access to the enabling infrastructures, products, skills and capabilities they need to enhance collaborative making. "Reuse, Remix, Recycle" are becoming the keywords of the open hardware and makers movement, which embodies a combination of different design and technology methods, such as fast prototyping, open design, lean development and DIY.**

Open hardware seeks to shift the attention away from consumption and resource exploitation, to the creation of new capacities to build the products that people consume according to a set of shared ethics and principles. The open hardware movement in particular is about how people share knowledge, skills and tools, and how you build communities around open products. People working on open source hardware are creating new organisations, such as the **Open Source Hardware Association**, to coordinate research projects, such as the open source cars Wikispeed, and build farming tools and new fabrication machines like the RepRap and others. These products are open source and free, with a worldwide community of peers contributing to the collective discoveries.

A project like **openp2pdesign** is opening up design processes and tools to enable collaborative communities to undertake large-scale projects that can lead to innovative results in open business, open government or open data. Projects like **Open Source Ecology** are promoting a shift towards a more sustainable lifestyle.

The makers movement is showing how experiments of collaboration and open culture can be applied to design, prototyping and production.

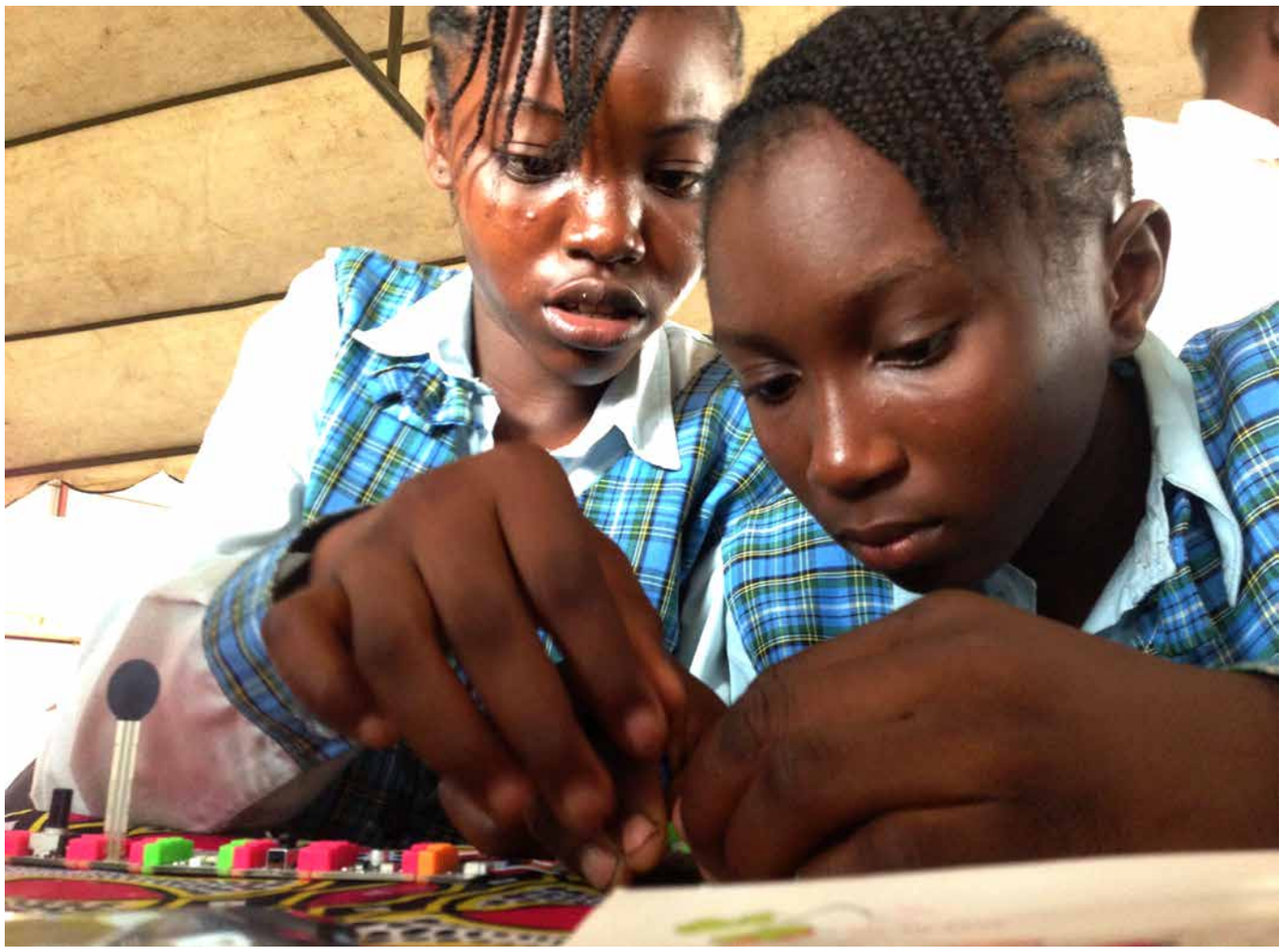
Interesting trends are emerging at the intersection between open hardware, DIY culture, open source software and open data. Projects and areas of work like ✡ **Safecast** or **open source Geiger**, the □ **Smart Citizen Kit** and **open wearables** are showing interesting potential in combining innovative technology trends to generate unexpected services.

Organisations, from grassroots movements, think-tanks and universities to big charities and public museums are hosting small-scale workshop spaces often with digital tools and 3D printing facilities (**maker spaces and hacker spaces**). There are now 96 known active hacker spaces worldwide, with 29 in the United States, according to Hackerspaces.org. There are many more Hacklabs around the world that are not branded as hacker spaces, but are community labs that incentivise the diffusion of free and p2p culture and open technology.

Makerspaces are new and rapidly evolving hotbeds of innovation, which have been facilitated by the latest in prototyping technology, while being rooted in traditional pillars of manufacturing: engineering, design, science and art.

The MIT founded a precursor in 2002 called **Fab Lab**, and since then makerspaces have expanded from the electronics-centric hacker spaces to having a stronger emphasis on groups that attract a diversity of professionals such as artists, machinists, robotics engineers, bicycle makers, jewellery makers, photographers and fashion designers.

**Waag Society in Amsterdam** is one of over 100 institutions worldwide hosting a Fab Lab (part of a global movement of Fab Lab makerspaces), which has been used to develop a number or digital social innovations, including the blueprint for a prototype of a 3D printed $50 prosthesis that can be used in developing countries. An interesting example that shows the possible convergence between makerspaces and Fab Labs is **WEFAB**, a makerspace in Milan with a focus on open source, design, digital fabrication and micro enterprises.



## Maker Fairs

MAKERS MOVEMENT

Maker Fairs are  interesting expressions of this new form of networking events that emerged out of the big diffusion of the Makers Movement. During Maker Fairs many organisations and people gather to showcase their projects and look for future trends in a similar fashion to traditional commercial art fairs. Born in 2006 in the United States from the idea of Make Magazine, it has become over the years an event for families and fans that want to celebrate a DIY (do it yourself) approach in science, inventions, crafts and electronics.

The biggest European Maker Fair was hosted in Rome during October 2014. The Maker Faire in Rome has hosted 230 makers, of which more than half are Italian and the rest are from all over Europe. This year, Maker Faire Rome's Call4Makers received 600 projects, 74 talk and 42 workshop proposals from 33 countries. In addition to its Call4Makers, Maker Faire Rome has promoted a Call4School for projects created and developed in high schools, with the 25 best Call4School projects invited to participate in the fair.

Another interesting example of collaborative innovation environments is the possibility of setting up **Urban Labs in Cities**. When using urban labs as a tool for urban development city government can improve relationships with their citizens by testing ideas in real world settings with all relevant stakeholders: citizens, companies and scientific institutions.

One interesting example of an Urban Lab is the **Barcelona Urban Lab**. It was created to facilitate the use of urban space as a laboratory available to companies that need to test their products and services in a real environment. These pilot products and services have to respond to an unmet municipal need, thus improving public service design and delivery. One project was the adaptation of all traffic lights in the city for the blind.

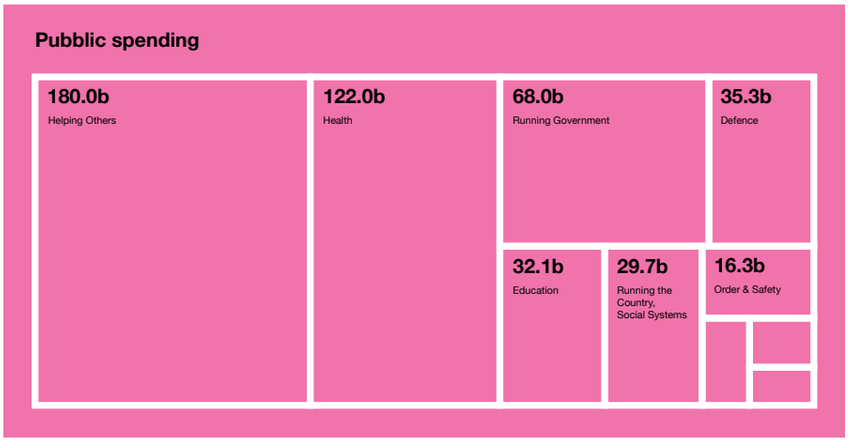
# OPEN DEMOCRACY

***Open democracy is transforming the traditional models of representative democracy. Digital technology can enable collective participation at a scale that was impossible before enabling citizens to be engaged in decision-making processes, collective deliberation, and mass mobilisation.***

Participatory democracy strives to create opportunities for all members of a population to make meaningful contributions to political decision-making, as well as broadening the range of people who have access to such opportunities. Since so much information must be gathered for the overall decision-making process to succeed, technology can help support participatory models, especially through technological tools that enable community narratives and the accretion of knowledge.

Organisations and projects pioneering open democracy, large-scale feedback, and citizen participation through crowdsourcing legislation, such as △ **Open Ministry** or △ **Liquid Feedback,** are transforming the traditional models of representative democracy.

○ **OpenSpending** encourages transparency and accountability, whilst participatory web platforms such as **Wikigender** and ○ **Wikiprogress** developed by the OECD facilitate the linking of National statistics to actual individual living conditions.




## ○ Openspending

OPEN BUDGET

OpenSpending is a data sharing community and web application that aims to track every government and corporate financial transaction across the world and to present that data in a useful and engaging form. OpenSpending is maintained by a community of contributors. Anyone interested in spending data of any kind is invited to contribute data to the OpenSpending database, create visualisations using the OpenSpending software and to use the OpenSpending API. Although the OpenSpending project has a strong focus on government finance, it supports any dataset consisting of a set of transactions, each associated with a quantity of money and a time. **Where Does My Money Go** was the first OpenSpending project. It allows UK citizens to examine where their taxes were being spent through an interactive 'bubble tree' visualisation. Other Openspending projects include visualising aid spending in Uganda and OffenerHaushalt in a way that allows users to explore and drill down through the various layers of Germany's federal budget.

Organisations like ○ **MySociety** and the △ **Open Knowledge Foundation** in the UK have developed services such as **FixMyStreet,** allowing citizens to report city problems, and **CKAN,** the biggest repository of open data in Europe, which is underpinning a new bottom-up ecosystem for digital public services.

Digital technology can thus enable collective participation at a scale that was once impossible and it is attracting a variety of citizens that are finding new ways of getting engaged with decision-making processes. Addressing citizens and **incorporating direct feedback** in detecting ideas and solutions has evolved to be a widely accepted method in urban development. Online voting and challenge prizes are helpful instruments for solving the problems of governments and administrations.

Globally, cities now adopt systems like **open 311** that provide a standardised and collaborative model to track civil issues and get fast responses from local government. Crowdsourcing processes also present challenges that are often related to managing the crowd, quality or limitations of ideas, public commitment from policymakers, or lack of investment. It is crucial for successful crowdsourcing to design the activity properly to prevent excessive demands and frustrations. In Europe, interesting crowdsourcing projects for cities are emerging from the **Open Cities** project and △ **Commons4EU**, drawing on the capabilities within communities (for instance, through utilising the skills of civic innovators and hackers) to design and deliver public services that meet our societies' changing needs.

△ **Your Priorities** platform in Reykjavik is offering a successful model experimenting with citizens in Iceland, integrating large-scale deliberation into democratic decision-making. The platform crowdsources opinions on city legislation, with the most popular ideas then being debated by the city council.

## △ Open Ministry

**CITIZEN INITIATIVES**

The Open Ministry is a Finnish non-profit, non-partisan organisation based in Helsinki, set up with the aim of enabling the crowdsourcing of legislation, promoting deliberative and participatory democracy and citizens initiatives. The Open Ministry utilises crowdsourcing and it is fully operated by volunteers independent of governmental political parties. A change of law in Finland was a major precipitating factor that made Open Ministry's mission a possibility. On 1st March 2012, the Finnish government amended the national constitution, so that any proposed legislation supported by at least 50,000 signatures (1.7 per cent of the voting population) must be put to a vote in the parliament within six months.

To get citizen proposals before parliament, the Open Ministry firstly helps citizens with an idea for a law proposal develop the initial concept idea and refine this in to a clear proposition that will be acceptable to parliament. It is then up to the citizen with the support of the Open Ministry to mobilise a minimum of 50,000 votes for the proposal, primarily through social media campaigning. If successful the proposal is brought before parliament for a debate and vote. Five proposals have been put before parliament to date, including a proposal for marriage equality, which reached over double the threshold number of votes in the first day of its campaign, thus making it virtually impossible for the parliament to ignore.

## D-CENT

COLLABORATIVE POLICY-MAKING

The Open Ministry is now part of the European D-CENT project that is building privacy-aware tools and applications for direct democracy and economic empowerment. D-CENT is developing a decentralised social networking platform for large-scale collaboration and decision-making and is piloting open source solutions across Europe engaging new political partices, citizen movements and governments. Through the W3C partner, D-CENT is also helping to develop and implement open social web standard standards, contributing to the W3C Federated Social Web Working Group.

**Change.org** is another example. It is a free petition tool with more than 70 million users around the world. Its mission is to empower people everywhere to create the change they want to see. MoveOn (http://front.moveon.org/) is another interesting case. It is a non-profit educational and vocational organisation set up in 2001, which mobilises a community of more than 8 million Americans who use innovative technology to lead, participate in and win campaigns for progressive change.

# AWARENESS NETWORKS

***Individuals, and communities are now able to aggregate data coming from people and the environment in order to create a new generation of products and services, fostering behavioral change. Platforms for collaboration are used to solve environmental issues and promote sustainable behavioral changes, or to mobilise collective action and respond to community emergencies.***

Some of the best examples of DSI in Europe are clearly positively impacting society. For instance **cities including Vienna and Santander** are pioneering new practices in open data and open sensor networks that are changing the provision and delivery of public services; **personal networks like Tyze** are generating new care communities that are being integrating with traditional social care provision; and sharing economy platforms like △ **Peerby** are creating new forms of relationships and services. Inspired by the open-source movement, individuals, self-organising groups and communities are beginning to aggregate the layers of data that increasingly permeate the urban environment, in order to create a new generation of products and services, fostering behavioural change[9] - for instance, platforms for collaboration to solve environmental issues and incentivise sustainable behavioural changes, such as ✡ **Safecast** and **BeAware.**

## ✡ Safecast

**OPEN SENSOR COMMUNITY**

Safecast is both the name of a Geiger counter built by the open source community as well as a global sensor network where Safecast owners can map and freely share their radiation measurements in open data sets. The overarching aim of Safecast is to encourage people to actively contribute to the generation of a body of data that might alleviate environmental problems. Safecast was founded by Sean Bonner, Joi Ito and Pieter Franken after March 11th 2011, when a 9.0 earthquake hit Japan and triggered a destructive tsunami which hit the Fukushima Daiichi nuclear power plant. In an effort to help, the partnership decided to take part in surfacing data on radiation levels across Japan, caused by the meltdown at the power plant. However, the Safecast team quickly realised that most of the devices used by the public to map radiation were of poor quality and there were massive holes in the public radiation data sets available. As a response to this, the team developed the bGiegie Geiger counter, built on the Arduino open hardware board.

The team turned to 'the crowd' via crowdfunding platform, Kickstarter, to finance the device and help launch a sensor network where bGiegie owners could share the data they were collecting. Safecast then worked with hackerspaces and used grant funding to update the counter, which amongst others enabled users to mount the counter on the outside of a car and use GPS technology to timestamp the data and log the location. All Safecast data is uploaded to an open data set, which visualises radiation levels across Japan. To date, the Safecast network has used the Geiger counter to map more than 13 million data points.

Platforms are also used to mobilise collective action and respond to community emergencies, as in the case of **Crisiscommons**, ○ **CrisisNET** and ○ **Ushahidi.**

## ○ CrisisNET

**CRISIS MAPPING**

CrisisNET is an initiative developed by Ushahidi[10], a non-profit tech company that specialises in developing free and open source software for the collection, visualisation and interactive mapping of information. The primary purpose of CrisisNET is to provide an easy to use tool which can continuously collect and organise crisis data from a variety sources, such as social media, sensors or even quasi-real-time data. The hope is that the quick and easy access to real-time crisis data will make it easier for organisations and developers to quickly to build their own applications without the need to spend days locating, identifying and processing data, thereby enabling much quicker responses to crises such as Ebola or conflicts.

These platforms can gather and integrate information, allowing participatory urban planning and improvements in social cohesion and collective wellbeing through the use of peer created information (e.g. **Action for Happiness** or **challenge.gov**). They also use effective visualisation tools to better understand environmental, social and economic indicators, and to bring them to public attention and create large-scale awareness.

# OPEN ACCESS

***The Open Access Ecosystem approach (including open access to content, open standards, open licensing, knowledge commons and digital rights) has the potential to empower citizens and increase participation, while preserving the openness and accessibility of the Internet infrastructure. It includes projects that are using bottom up privacy-preserving and decentralised infrastructures, and the diffusion of knowledge systems in the Public Domain.***

Many activities in this area exploit the power of open data, open APIs, and citizen science such as **Open Data Challenge and Open Cities** that provide citizens with better public services, or ◯ **CitySDK** which is defining interoperable interfaces for city-scale applications. Other projects are exploring the potential of federated social networking, such as **D-CENT** and **Diaspora**, and the promotion and diffusion of knowledge systems in the public domain, such as △ **Communia**. These activities are favouring a shift towards open access and transparency, thus having an impact on the underlying norms and institutions that drive society.

Projects such as ✡ **Confine**, **Commotion** and ✡ **Tor** are using bottom-up privacy-preserving decentralised infrastructure for the open Internet constituted by open standards, open data, free and open software and open hardware.

△ **Github**, the collaborative service for open software developers, is revolutionising the way code is built, shared and maintained by a variety of projects around the globe. Important developments to re-decentralise the Internet, leveraging P2P open technologies, are happening at many levels. For instance distributed social networking projects such as Diaspora, Status.net or easy-to-run servers like arkOS – which make it easy to run your own secure cloud – and decentralised media publishing platforms, such as mediagoblin, are gaining new momentum. This open ecosystem approach has the potential to empower citizens and increase participation, while preserving the openness and accessibility of the Internet infrastructure.

Many activities in this space are driven by grassroots networks, like **Observe Hack Make**, a five day outdoor international camping festival for hackers and makers, and the **Chaos Communication Camp**, an international meeting of hackers that takes place every four years, organised by the Chaos Computer Club (CCC)[11], an informal association of hackers from across Europe.

## The Chaos Computer Club (CCC)

HACKERS NETWORKS

The Chaos Computer Club (CCC), Europe's largest network of hackers, is the most prominent example of grassroots communities coming together to develop and provide information about technical and societal issues, such as surveillance, privacy, freedom of information, hacktivism and data security. The CCC is based in Germany and other German-speaking countries and currently has over 4,000 members. The CCC advocates more transparency in government, freedom of information, human rights and communication. Supporting the principles of the hacker ethic, the club also fights for free access to computers and technological infrastructure for everybody. The latest gathering of the CCC in 2012 in Hamburg, Germany, brought together 6,000 participants.

The ability to access knowledge and bottom-up infrastructures is also changing the state of **education**. It brings primary sources into every classroom and allows for more open and rapid communication between teachers and students. For instance, **The Open University**, based in the United Kingdom, and other models of distance learning have made education much more widely available. The same goes for the way scientific research is being done, with its culture being influenced through the ability to globally access and share knowledge, culture, information and code and to undertake better collaboration within the research community.

A good example of where developments in DSI could lead us is the project **Primo**, which was born out of collaboration between **Arduino** and designers in the Master of Advanced Studies in Interaction design at SUSPI in Lugano. Primo is made from an Arduino board, a car and a set of instruction blocks all made out of wood. Its objective is to teach the high-level abstraction of programming as a sequence of instructions to young children in schools, creating an appealing game. These kinds of projects are able to combine open hardware technologies with new learning methods to experiment with new educational practices, enhanced by the way technology is integrated within the learning environment.

**Open standards**

A number of organisations affect DSI in Europe through acting as expert bodies on the development of policy and strategies and advocating and campaigning for standards for DSI.

## The World Wide Web Consortium (W3C),

OPEN STANDARD BODY

The **World Wide Web Consortium** (W3C), an international community that works on developing and advocating for Open Standards, the **P2P foundation**, that works on promoting peer-to-peer practices, and the **IoT Council**, promoting an open Internet of Things vision, are good examples of this. Expert bodies are essential for providing expertise and coordinating inclusive processes of decision-making amongst key stakeholders.

# FUNDING, ACCELLERATION, INCUBATION

***A range of incubators, accelerators, impact incvestment schemes have been set up by public and private funders to support digital innovation projects. They do this through a combination of seed fundings as well as non-financial support such as access to co-working spaces and business support and mentores***

As it has been the case with the support for innovative businesses, social innovations often need support in the early idea stages to refine their business models and grow their venture. The global study Good Incubation (2014) [12] explores how social venture incubation has grown as a set of techniques to help founders develop ventures that are investable propositions, including a focus on incubators with a specific focus on supporting digital social innovators.

Incubators typically support innovators in exchange for equity, at pre-seed or seed stage. There are nearly 100 incubators/accelerators in Europe.

Large foundations and charities often play an active role in hosting and running makerspaces and incubators focusing on supporting DSI.

The work by **Nesta i**n the UK, on the tech for good incubator △ **Bethnal Green Ventures**, and **the Waag society** in Amsterdam, working on setting up and hosting one of Europe's first Fab Labs, are two examples of this in Europe. In the United States**, Code for America** provides seed funding, office space, and mentorship to civic start-ups through its accelerator.

**Y Combinator** was the first of its kind when it started back in 2005 and its success inspired many others. **Bethnal Green Ventures** in the UK, who support early-stage technology start-ups tackling a social or environmental problem with £15,000 and 3 months intensive support in return for 6 per cent equity, is another example.

Nowadays, the biggest names are international start-up accelerators such as **TechStars, Seedcamp** or **Startbootcamp.** But there is an increasing number of big corporation-backed accelerators, such as **Wayra** from Telefónnica or **Orange FAB** from Orange and a plethora of regional start-up acceleration programs.

## The Open Data Institute (ODI)

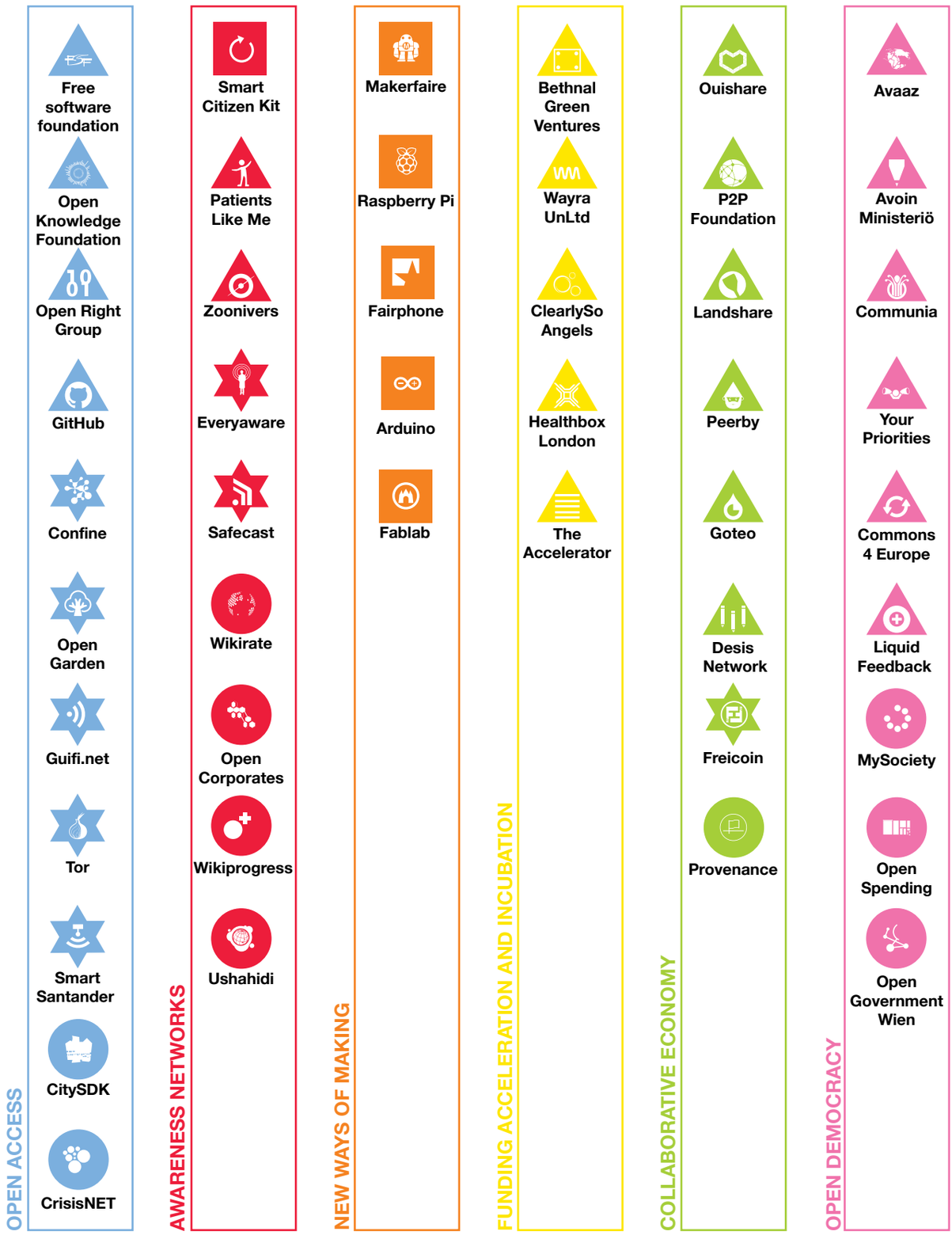
OPEN DATA ACCELLERATOR

**The Open Data Institute's** start up programme, which has supported organisations like **Open Corporate** and **Provenance** to grow their open data projects, is one of them.[13] Although incubators and accelerators have been always around, their presence in aiming to address social challenges has been rather limited to date.

Traditional business accelerators offer advice and resources to fledgling firms to help them grow. In contrast, **Civic Accelerators** can match cities with start-ups, private firms and non-profit organisations interested in partnering with government to provide better services, bring digital technology to cities, or change the way citizens interact with city government.

Finally, **crowdfunding platforms** serve as intermediaries to link people and to stimulate and fund new ideas. There is the growth of the alternative finance industry, including crowdfunding and P2P lending that has been deeply documented by Nesta in the UK[14]

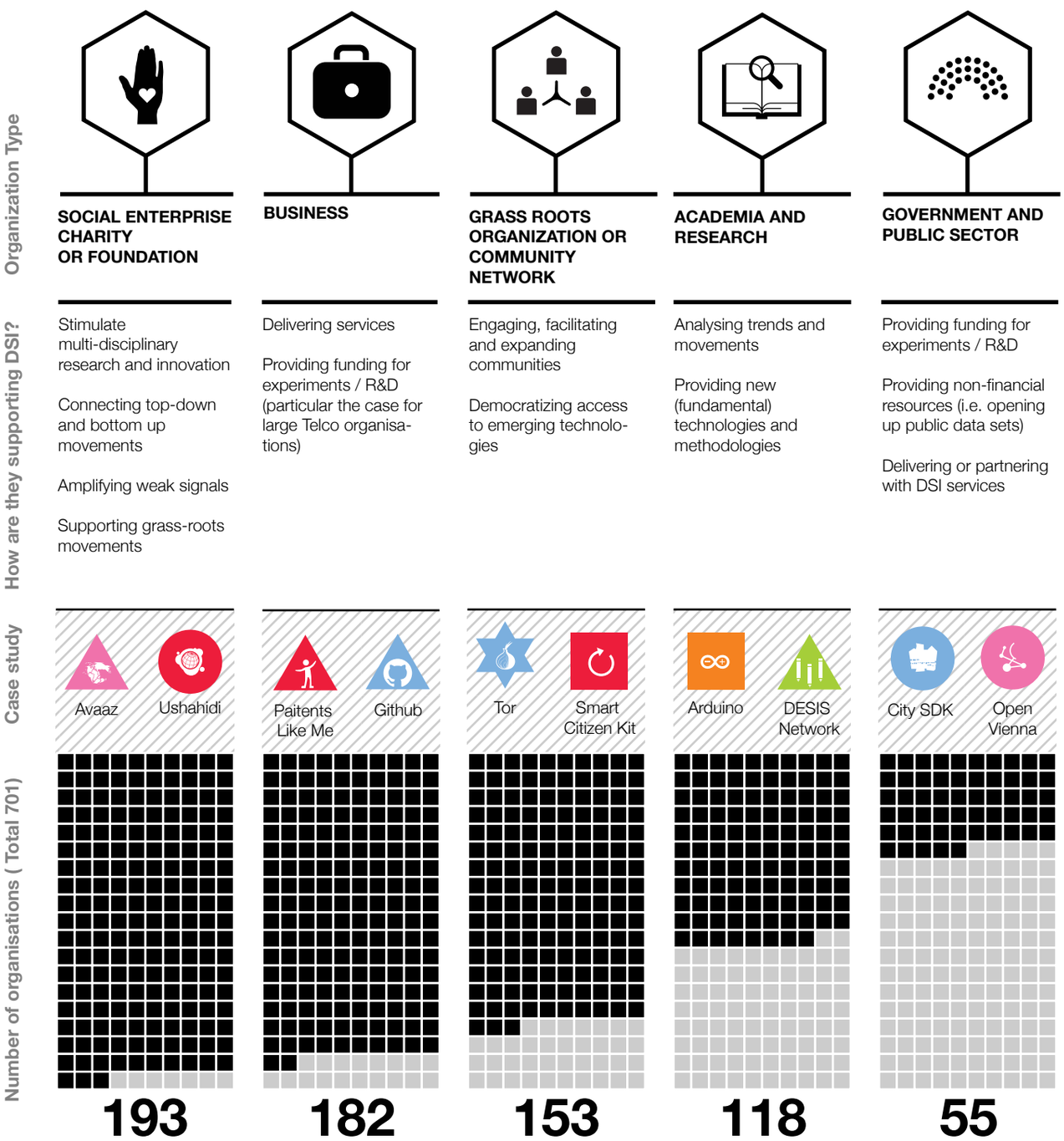
**Case studies categorised into the 6 different types of DSI**



# 2.3 WHO ARE THE ORGANISATIONS INVOLVED IN SUPPORTING OR DELIVERING DSI?

The type of organisation is a field of information sought for each of the Digital Social Innovation organisations. Figure below shows the numbers of each type of organisation as correct at time of writing (Nov 2014).

**Types of organisation**

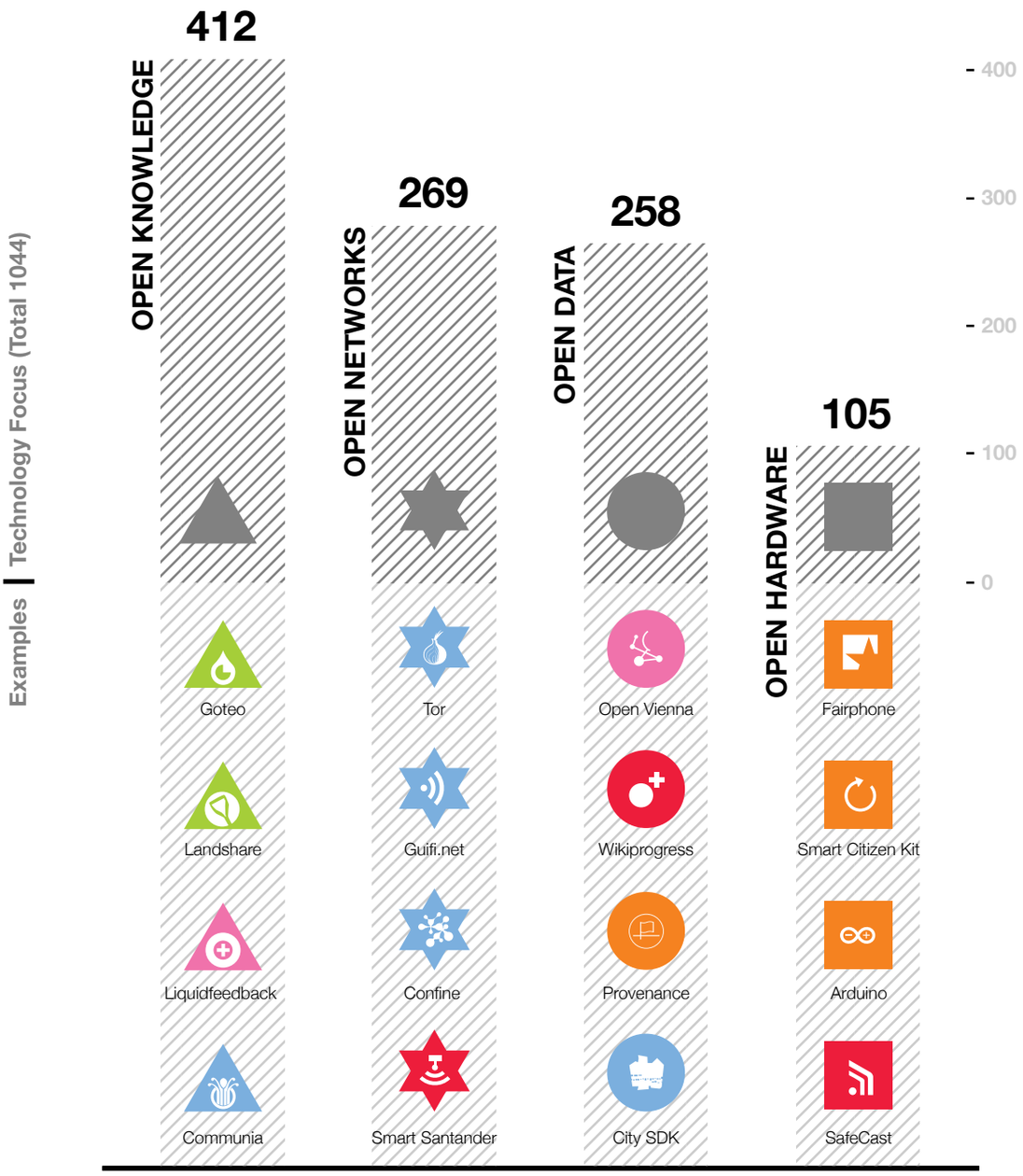


## 2.4 TECHNOLOGICAL TRENDS IN DIGITAL SOCIAL INNOVATION

Although there is a huge variety in the different types of DSI and the technologies these innovations use, a look across the different types of DSI we have examined to date shows four main technological 'trends' (Bollier and Clippinger 2013): open knowledge, open data, open networks, and open hardware.

Through case study analysis we have sought to build up an understanding of the extent these emerging technologies, such as open data, open networks, open hardware and open knowledge, are being harnessed by digital social innovation. Below we provide a more detailed description of how these trends can be defined, and the insights we are deriving from case studies about these. It is important to note that the activities of many of the most exciting digital social innovations can be grouped under two or more trends. Safecast, for example relied on open hardware to build the first Geiger counter sensor kit, on Crowdfunding to fund the development of kit, and on open data to share and analyse the data captured across all of the Geiger counters. Within these broader technology areas, we have been identifying a variety of more specific technologies and activities adopted by DSI activities such as: **social media, crowdsourcing, crowdfunding, big data, machine learning, 3D printing, online learning and e-petitions.**

**The main technological trends in DSI**



# OPEN NETWORKS

***Innovative combinations of network solutions and infrastructures, e.g. sensor networks, free interoperable network services, open Wifi, bottom-up-broadband, distributed social networks, p2p infrastructures***

The ability to build bottom-up networking capabilities in every corner or the world and in people's everyday lives has become a key enabling factor for the spreading of the digital society. Here we describe some of the most interesting trends in the open network area, such as **wireless sensor networks, community (bottom-up) networking and privacy-aware open networks.**

A **wireless sensor network (WSN)** consists of spatially distributed wireless sensors to monitor physical conditions, such as temperature, sound, vibration, pressure, motion or pollutants, and to pass their data through the network to a single or replicated data-processing location. An **open sensor network (OSN)** is a wireless sensor network that manages open information in an open environment. An OSN stands for an interoperable sensor network, where many vendors or entities can connect their sensor solutions and those sensors interact with other ones or with the centralised data system using standard communications. The open sensor network connects the sensor with the data repository where the information is processed and stored, as it uses public data from different sensors and forwards the gathered information to the central point within a wireless environment.

Sensor networks are the key infrastructures of a smart city, providing basic data on the usage of energy, pollution, geodata, traffic, geography, tourism and other areas. Possible future services based on OSN include mobile applications that support citizens using public transport by displaying real time information on arrival and departure, or traffic information for car drivers. Another application area is the measurement of air pollution, temperature and humidity, or light sensors that provide a large variety of sensor networks and offer possibilities for developing mobile applications, which would be fed by open data from the OSN.

A number of European cities have established sensors that detect traffic density and some initiatives to monitor the arrival of public transport. Most European cities work with sensors that monitor environmental conditions. Pollution, temperature, humidity and light sensors are installed that provide information that could be used to develop applications for citizens or to be added to other applications as mashups. All mobility and environmental sensor networks could be interconnected with the OSN platform in order to provide external parties a single point to consume this data.

For instance, ✡ **Smart Santander** demonstrates the potential of creating large networks of sensors that capture activity from static sensors as well as citizens to create cities that better and more efficiently react to citizen needs. These sensors provide the opportunity to implement applications that help citizens to move around in cities.

**Community networking (also known as bottom-up networking)** is an emerging model for the Future Internet across Europe and beyond, where communities of citizens build, operate and own open IP-based networks, a key infrastructure for individual and collective digital participation. While commercial access networks from either commercial telecom companies or by local governments tend to follow a well-known centralised network architecture and operation model, community-owned open local IP networks are an emerging model of infrastructures that is open, decentralised and can be collectively more resilient. Internet networks have become a key infrastructure for the development of the digital economy due to the 'democratisation' of the access technologies, reducing the price and complexity in setting up wired or wireless links.

**The Confine Testbed** experimental facility supports experimentally-driven research on community-owned open local IP Networks. This integrated project (2011-2015) offers a testbed for experimental research that integrates (in a federation) and extends three existing community networks: ✡ **Guifi.net** (Catalonia, Spain), FunkFeuer (Wien, Austria) and AWMN (Athens, Greece). Each is in the range of 500 – 20,000 nodes, with a greater number of links and even more end users. These networks are extremely dynamic and diverse, and combine successfully different wireless and wired (optical) link technologies, fixed and ad-hoc routing schemes and management schemes. They run multiple self-provisioned, experimental and commercial services and applications. A common entry point allows researchers to select a set of resources, and then deploy, run, monitor

and experiment with services and protocols. This is done on real-world IP community networks that incorporate a wide variety of wired and wireless links, nodes, routing, applications and users. The testbed is a resource for the research community to address the limits and obstacles regarding Internet specifications that are exposed by these edge networks.

## ✡ Guifi.net

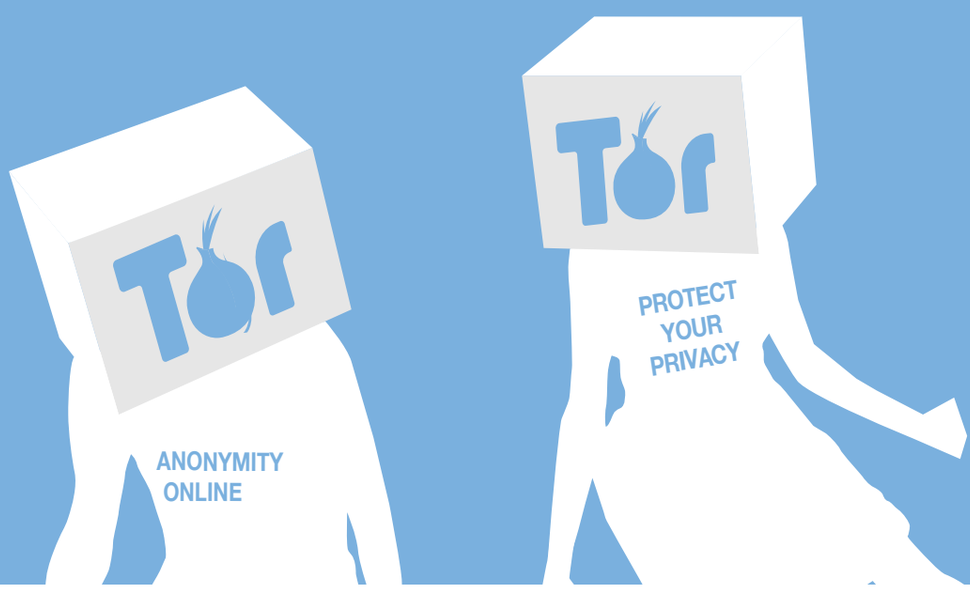
COMMUNITY NETWORKS

The **Guifi.net** initiative is developing a free, open and neutral, mostly wireless telecommunication community network. It started in Catalonia in 2004 and as of January 2012 it has more than 15,300 working nodes, most of them linked to a main network in Catalonia. Many other local networks are growing all around Spain. Guifi.net is connected to the Catalan Internet Exchange (CATNIX) as an autonomous system (AS) via optical fibre with IPv4 and IPv6.

## ✡ Tor

PRIVACY AWARE NETWORK

The work by **Tor** on creating secure, **privacy-aware and crypto tools** that bounce Internet users' and websites' traffic through 'relays' run by thousands of volunteers around the world, making it extremely hard for anyone to identify the source of the information or the location of the user, is one example of open networks enabling citizens to protect their digital rights online. TOR also enables software developers to create new communication tools with built-in privacy features and provides the foundation for a range of applications that allow organisations and individuals to share information over public networks without compromising their privacy. The Tor network's 4000-plus volunteer-led model relays over half a million daily users. Such tools are powerful in the hands of individuals and communities, as shown by the use of **Wikileaks** to expose government accountability and transparency by supporting journalists and other experts to access information and report key stories.



## OPEN DATA

***Innovative ways to capture, use, analyse, and interpret open data coming from people and from the environment***

The explosion of new types of data analytics and machine learning means that it is no longer only government or corporate forecasters who have the opportunity to access and analyse data. By making data open, governments and other large organisations and companies that hold or generate data about society have the opportunity to enable citizens to hold government to account for what it spends, the contracts it gives and the assets it holds.

Local authorities are playing a leading role in implementing open data policies and driving forward the open data movement. The social benefits of open government vary from **citizen engagement to increased transparency and accountability**, as well as enhanced interaction between governments, other institutions, and the public. For instance, citizens are gaining greater insight into how their tax payments are being spent.

Beyond the social aspects, open data also supports public sector innovation by breaking the competitive advantage gained by proprietary access to data and data lock-in. Innovation is most likely to occur when data is available online in open, structured, computer-friendly formats for anyone to download, use, and analyse, as long as the privacy and data protection of all citizens is preserved and that communities are entitled to share the value and social benefits of public assets. Thus, **open data, together with open and standardised APIs** is crucial for open innovation, as developers are able to access and use public data and mesh it with other sources of data produced by the crowd to build novel applications that have a social utility.

Another important trend, boosting the diffusion of open data is the increasing number of mobile devices. Smartphones, tablets, PDAs and other devices are becoming smaller, faster, smarter, more networked and personal. Dataflows are also burgeoning as the **Internet of Things** integrates a vast universe of network-aware sensors, actuators, video cameras, RFID-tagged objects and other devices that see, hear, move, coordinate and 'reason' with each other.

For instance, the **city of Vienna has, with its Open Data in Vienna** programme, demonstrated the potential in opening up its data. The city opened its data records to the population, businesses and the scientific community. Released data ranges from statistics and geographic data on traffic and transport to economic figures. It then invited programmers and developers to make apps and web services based on the data, which to date have resulted in more than 60 applications for citizens. Other pioneering examples include the work by the Estonian Government and the not-for-profit Praxis on the Meiraha project, which focuses on opening up and visualising the Estonian budget. The citizen science project Globe at Night is yet another example of this, where citizens using the camera and geo-tagging functions on their smartphones help the research project measure global levels of light pollution, effectively coupling open data and citizen science.

## Helsinki Region Infoshare

OPEN DATA FOR REGIONS

Through an entity called Helsinki Region Infoshare[34] , Helsinki and three of its neighbouring cities publish all of their data in formats that make it easy for software developers, researchers, journalists and others to analyse, combine or turn into web-based or mobile applications that citizens may find useful. The movement for more and better open data has grown significantly over the last few years through projects funded by the European Commission, such as City SDK that help cities to standardise their interfaces and reuse solutions across Europe.

There are other local governments around the world that are successfully developing open data portals. In the United States, the cities of Chicago, San Francisco, Philadelphia, and New York are only a few of the examples worth mentioning. British Columbia in Canada, the region of Piedmonte in Italy, and Metropolitan Rennes in France have also set up open data websites at the regional level that can be considered good practices, and in the Barcelona Metropolitan Region, the city of Barcelona is leading Multicouncil Open Data.

## Open Data Challenge

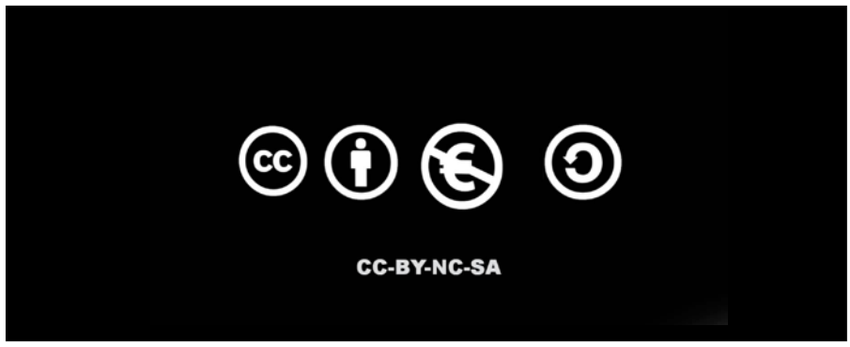
OPEN DATA FOR REGIONS

There are several examples where Governments and the developer communities interact. One of them is the examples of competitions and challenges. One of Europe's biggest open data competitions is the **Open Data Challenge**[15]. It was organized by the Open Knowledge Foundation, the Openforum Academy and Share-PSI.eu. It offered 20,000 Euros in prizes to win and revieved a total of 430 entries from 24 European Union member states. There were several categories: Prize Idea, Prize App, Price Visualization, Better Data Award, Open Data Award, and Talis Award for Linked data. In total, 13 awards were given. There are many other competitions, such as **Apps4Finland**[16] , the biggest European apps contest organized since 2009 and **Apps for Amsterdam** promoted by the City of Amsterdam to make accessible to developers and citizens the data of the City.

## OPEN KNOWLEDGE

***Co-production of new knowledge and crowd mobilisation based on open content, open source and open access***

The contribution of open knowledge covers the variety of ways in which citizens can use online services and platforms for mass scale social collaboration. Ordinary people today use blogs, wikis, social networks and hundreds of other collaborative platforms to manage their daily lives, solve social challenges, and to participate in e-campaigns, crowdfunding etc. Furthermore, the ability to access, use, and reuse without financial, legal, contractual and technical restrictions (alligned with the Budapest open access initiative, released as creative commons or in the public domain) is key for knowledge co-creation networks to spread. Open access provides an economic and social return through dissemination to citizens, taxpayers and researchers from other countries and other disciplines. Recent global developments have revealed increasing demands of citizens for their governments and administrations to become more participatory, transparent and accountable.




### Communia

PUBLIC DOMAIN

**Communia**, a European Union-wide thematic network that focuses on strategic policy discussion of existing and emerging issues concerning the public domain in the digital environment is one example of this, as is the work by the social innovation research project **COMMUNIA**. The European Thematic Network on the Digital Public Domain is an international association based in Brussels. COMMUNIA is built on the eponymous COMMUNIA Project Thematic Network, funded by the European Commission from 2007 to 2011, which issued the Public Domain Manifesto and gathered over 50 members from academia and civil society researching the digital public domain in Europe and worldwide. **The Public Domain** is defined as the wealth of information that is free from the barriers usually associated with copyright protection, either because it is free from any copyright protection or because the right holders have decided to remove these barriers. COMMUNIA Association and its members raise awareness in, educate about, advocate for, offer expertise on, and research about the public domain in the digital age.

Along with Communia, **TEPSIE (**researching the role of ICT and social innovation) and **LIPSE (**researching innovation in public sector environments) are further examples of research activities and research networks aiming to further our understanding of DSI as a phenomenon.

Building on long-term EU research projects like **Commons4EU,** networks of EU organisations (academic and non-academic) have partnered to collectively explore the development of DSI practice through joint research and development. In the case of Commons4EU, partners got together to explore the development of collaborative web projects and bottom-up broadband technologies[15]. Other interesting examples of multidisciplinary research projects are **the Network of Excellence on Internet Science (EINS),** that aims to integrate multidisciplinary scientific understanding of Internet networks and their co-evolution with society, and the **Knowledge and Innovation Communities (KICs),** promoted by the European Institute of Innovation and Technology that are coordinating research on ICT for society in different domains, such as climate change, sustainable energy and communication technology itself.

A very interesting project, which is not funded by the European Union but shows how open research works, is **FLOK Society in Ecuador**.

## FLOK

APPS CHALLENGES

**FLOK is an open research project aimed at creating policy proposals and political actions to transition Ecuador to a full commons-based knowledge economy. The project is a joint research effort sponsored by the Co-ordinating Ministry of Knowledge and Human Talent, the Senescyt, (Secretaria National de Educacion Superior, Ciencia, Tecnologia e Innovacion) and the IAEN (Instituto de Altos Estudios del Estado). It seeks the involvement and input of local civil society but also includes an explicit appeal to the global co-operative and commons movements to assist them with advice and policy proposals.**

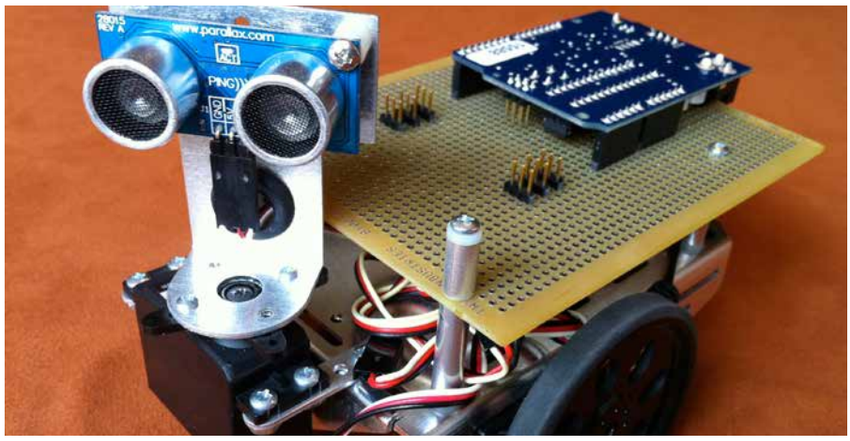
One of these policy proposals is around skills and training. A fundamental requirement for DSI is that innovators with an ambition to use technology for social good have the skillset to use and apply digital technologies. Collaborative networks of DSI organisations are able to foster these skills that often are not being provided by traditional education and training organisations. To cater to this need a number of projects have emerged, such as Apps for Goodi or the Open Data Institute's (UK) open data training sessions for charities. Real empowerment through access to knowledge and education happens when groups and individual can acquire skills and gain access to resources and opportunities to develop the knowledge and self-sufficiency toachieve inclusion in decision-making processes. These are some of the main initiatives within the DSI field that are focusing on capacity-building & constructing informal learning networks: **Fab academy; Institute for network culture; Coder dojo's**; and more generally the hacking culture of sharing skills and knowledge.

## OPEN HARDWARE

***new ways of making and using open hardware solutions and moving towards and Open Source Internet of Thingst***

Open-source hardware consists of hardware whose blueprints are made publicly available so that anyone can study, modify, distribute, make, extend and sell hardware based on that design. The hardware's source, the design from which it is made, is available in the preferred format for making modifications to it. Ideally, open-source hardware uses readily available components and materials, standard processes, open infrastructure, unrestricted content and open-source design tools to maximise the ability of individuals to make and use hardware. Open-source hardware gives people the freedom to control their technology while sharing knowledge and encouraging commerce through the open exchange of designs.

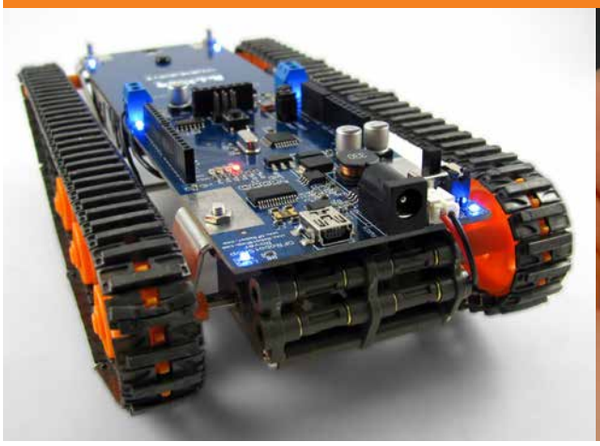
The work by organisations like ☐ **Raspberry Pi** and ☐ **Arduino** illustrates the potential in open hardware.

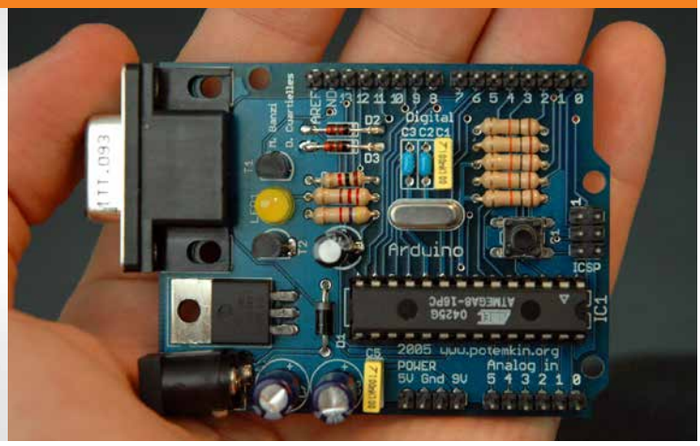



### ☐ Arduino

OPEN HARDWARE

The core to **Arduino** is a simple, ultra low-cost circuit board, based on an open-source design, armed with a microprocessor which can be programmed with open-source software tools by the user. The idea is that anyone should be able to turn an Arduino into a simple electronic device such as a light switch and sensor. In 2005, Massimo Banzi, an Italian engineer and designer, started the Arduino project to enable students at the Interaction Design Institute Ivrea (IDII) to build electronic devices using an open-source hardware board. Arduino has grown to become popular, selling more than one million units to date, largely because of its creators' decision to make the board's design 'open source', along with its quick adoption by the international maker movement of D.I.Y. hardware hobbyists, such as makerspaces and Fab Labs.



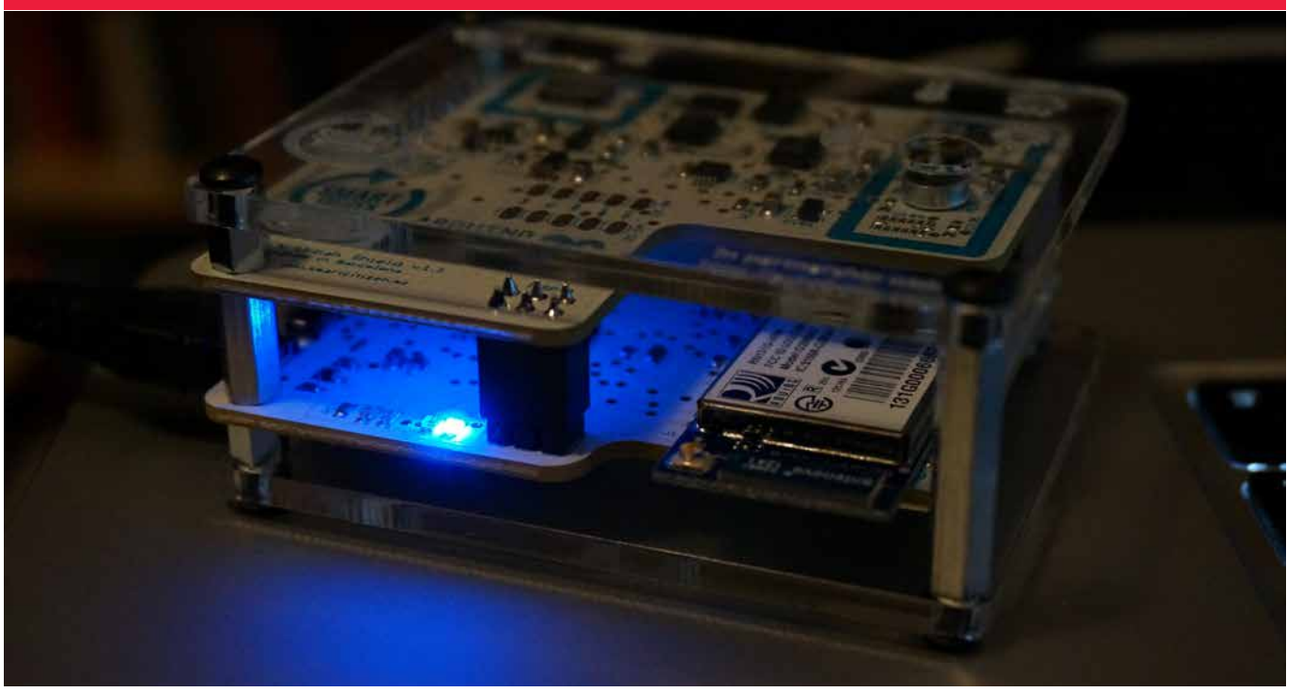



This makes Arduino a key building block of many digital social innovation initiatives relying on open hardware, such as ✡ **Safecast** and the ☐ **Smart Citizen Kit**.

## Smart Citizen Kit

**OPEN HARDWARE**

**Citizen Kit** is an Arduino based sensor kit that provides sophisticated sensor network tools to citizens, enabling the measurement of levels of air pollution, noise pollution or air humidity in the vicinity of a private home, school or office. The project was originally developed within the Fab Lab Barcelona at the Institute for Advanced Architecture of Catalonia and crowdfunded via the Goteo and Kickstarter crowdfunding platforms. With its relatively low-cost model the Smart Citizen Kit sees itself as acting as a bridge between more typically technical and non-technical citizens, both seeking to solve environmental challenges in unconventional ways through better monitoring. The Smart Citizen Kit is based on two core components; the 'kit ' itself and the platform used to share data between people operating a kit. The kit is an electronic board based on the Arduino, equipped with sensors that capture data on air quality, temperature, noise, humidity and light. The board also contains a WiFi antenna that enables the direct upload of data from the sensors in real time. A number of cities, including Manchester in the UK and Amsterdam in the Netherlands, have shown an interest in supporting citizens to monitor environmental data and have launched city pilots using the Smart Citizen Kit.



Another big trend related to open hardware is the evolution of the **Internet of Things (IoT)**. People, places, and objects can be instrumented with tracking and sensing devices that continuously stream and measure data about real-world activity. This is possible due to the increasing number of **powerful smart personal devices**, which facilitate the anywhere/anytime access to the Internet, and to new services So-called Cyber Physical Systems (CPS), which are becoming increasingly important in this context. The networking of embedded ICT systems both with one another and with the Internet, is giving rise to what has been named as Industry 4.0[19]

This smart infrastructure is also increasingly "getting to know people" by aggregating personal and social data in massive data centres. This can also mean increased surveillance, prediction and control of people and the environment. However, as outlined by Rob Van Kranenburg, "successful IoT means the best possible feedback on our physical and mental health, the best possible deals based on a real time monitoring for resource allocation, the best possible decision making based on a real time data and information from open sources and the best possible alignments of my local providers with the global potential of wider communities" (Van Kranenburg 2014)

## DSI AREAS

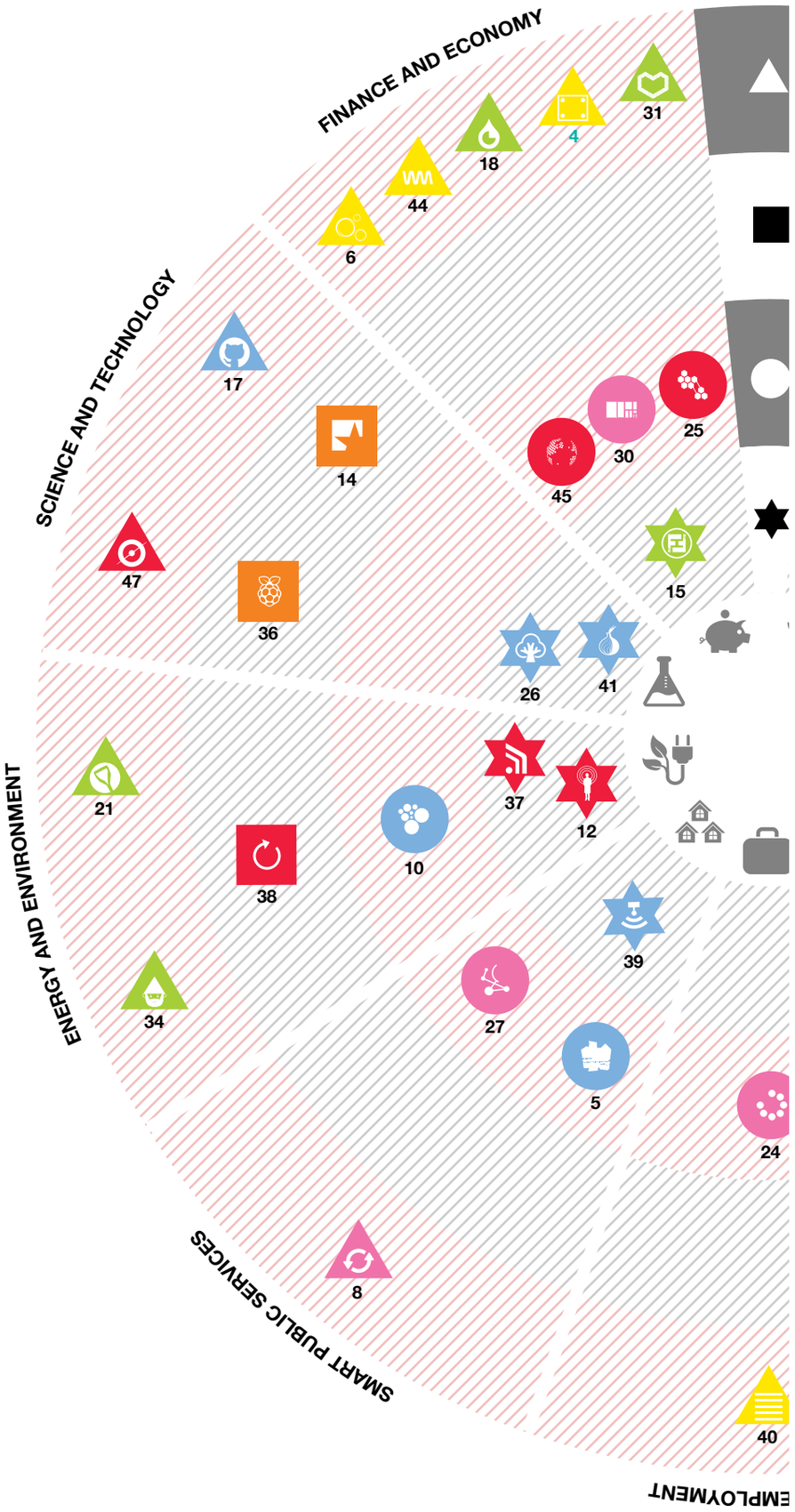
- Open democracy
- Open access
- Collaborative economy
- Awarness network
- New ways of making
- Funding acceleration and incubation

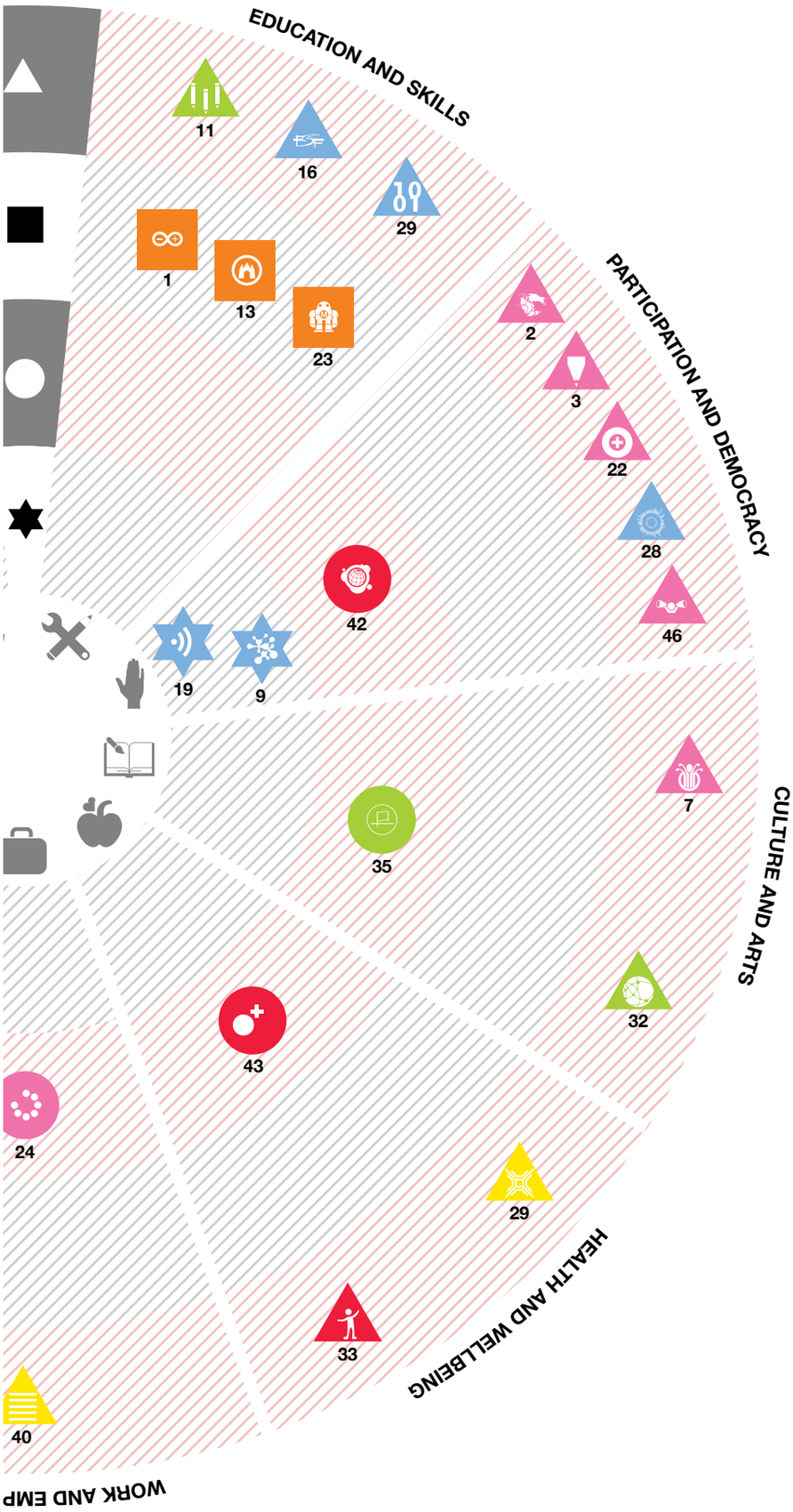
## TECHNOLOGY AREAS

- Open Knowledge
- Open Hardware
- Open Data
- Open Networks

## AREAS OF SOCIETY

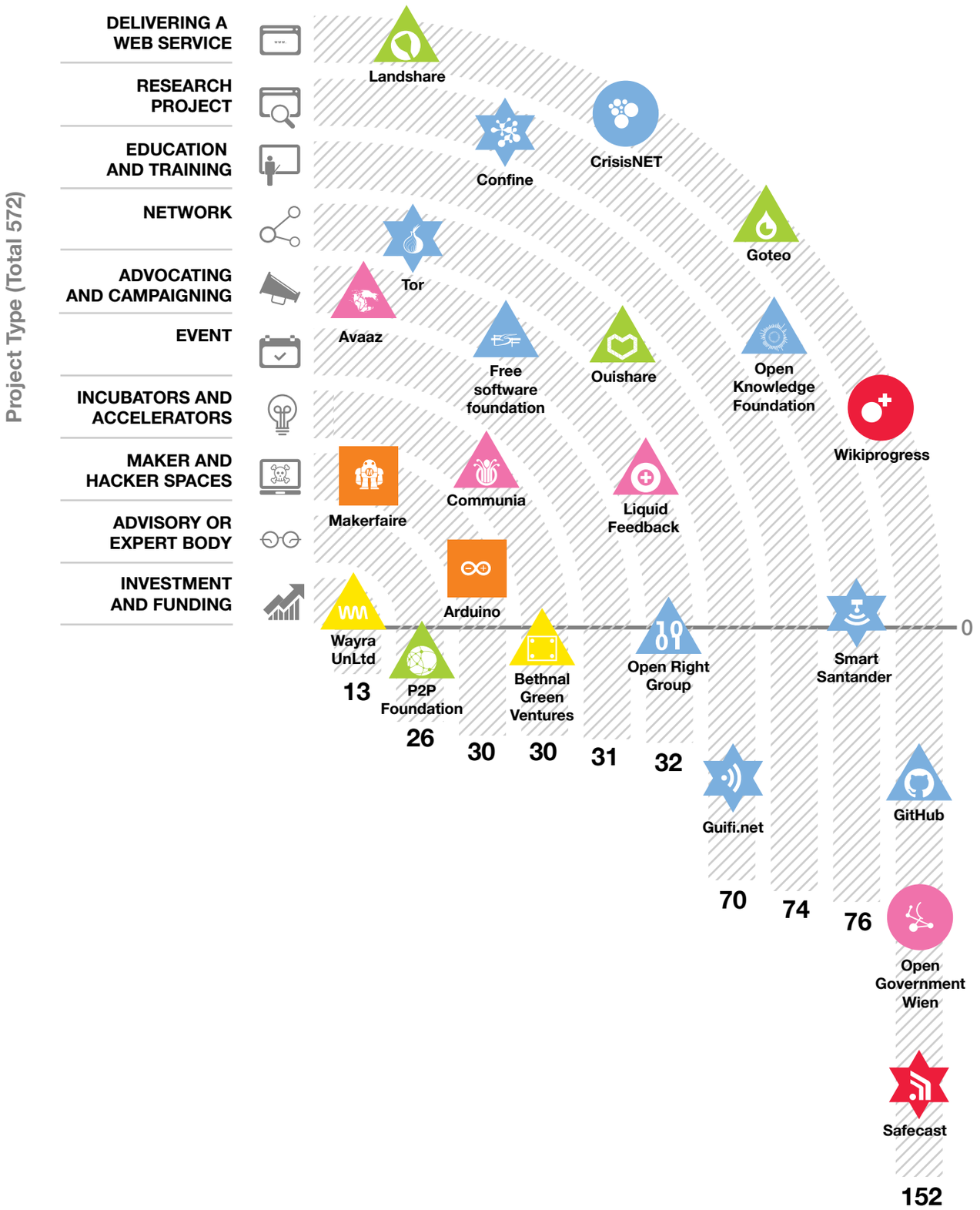
- Health and Wellbeing
- Finance and Economy
- Energy and Environment
- Participation and Democracy
- Smart public services
- Science and technology
- Education and skills
- Culture and Arts
- Work and Employment



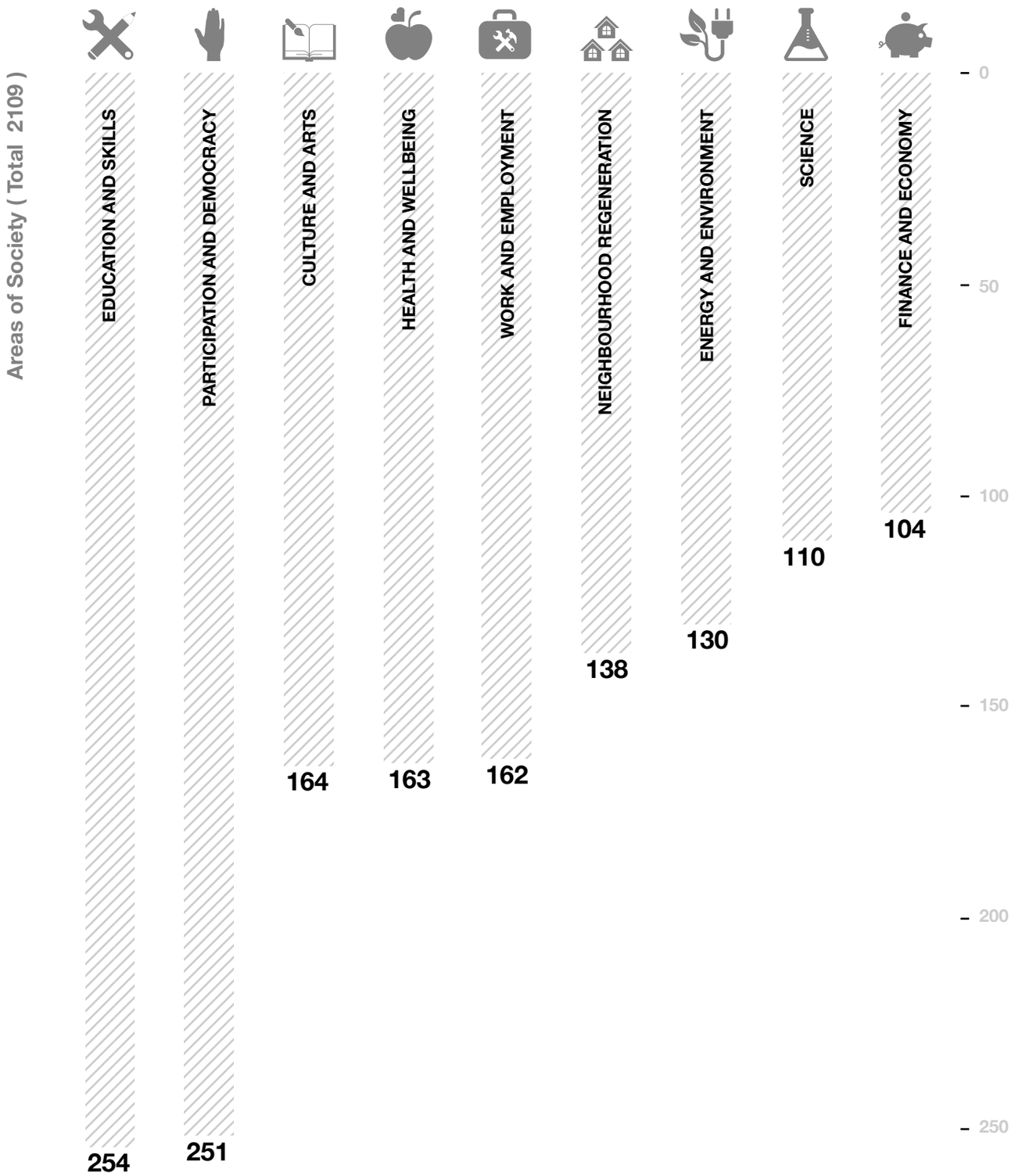



1. Arduino
2. Avaaz
3. Avoin Ministeriö
4. Bethnal Green Ventures
5. CitySDK
6. ClearlySo Angels
7. Communia
8. Commons 4 Europe
9. Confine
10. CrisisNET
11. Desis Network
12. Everyaware
13. Fablab
14. Fairphone
15. Freicoin
16. Free software foundation
17. GitHub
18. Goteo
19. Guifi.net
20. Healthbox London
21. Landshare
22. Liquid Feedback
23. Makerfaire
24. MySociety
25. Open Corporates
26. Open Garden
27. Open Government Wien
28. Open Knowledge Foundation
29. Open Right Group
30. Open Spending
31. Ouishare
32. P2P Foundation
33. Patients Like Me
34. Peerby
35. Provenance
36. Raspberry Pi
37. Safecast
38. Smart Citizen Kit
39. Smart Santander
40. The Accelerator
41. Tor
42. Ushahidi
43. Wikiprogress
44. Wayra UnLtd
45. Wikirate
46. Your Priorities
47. Zooniverse

**The different methods by which these organisations are supporting DSI**



**The areas of society these DSI organisations impact**



# 3

# EXPLORING DSI NETWORK EFFECT

***3.1***

***What communities of social innovation exist in Europe?***

***3. 2***

***Which organisations currently bridge the various communities?***

***3. 3***

***What are the conditions for scaling DSI?***

One of the primary problems facing the mapping of an open-ended field such as DSI is how to direct the multiple diverse streams of data from interviews to social media into a central repository capable of giving a 'big picture' of European DSI that can provide strategic recommendations for the EC.

Using the network data, stored as W3C Linked Data at http://data.digitalsocial.eu, in combination with our hybrid iterative strategy of case study interviews, workshops and events relevant to these communities, we have identified DSI actors as part of a larger social network and have mapped this network in a way that has not been possible before.

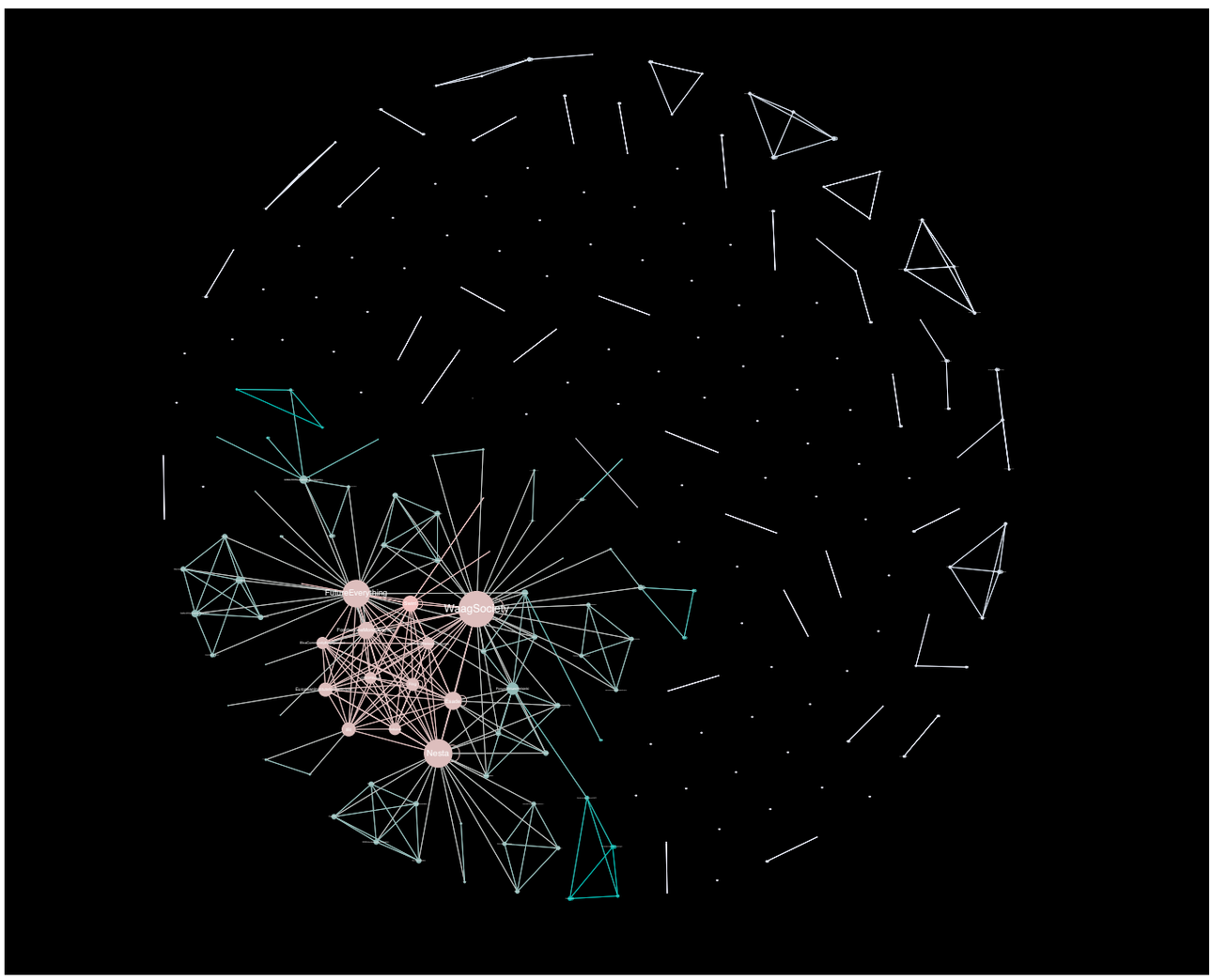
Social networks are formally defined as set of nodes (or network members) that are tied by one or more types of relations (Wasserman and Faust, 1994). In the case of the DSI social network collected in this study, the nodes in a graph are organisations, and the edges represent joint projects.

The results of this analysis have informed the recommendations on a policy and instrument level that are needed for the EC to knit the map of DSI actors into a coherent single integrated EC DSI network, and thus achieve **the 'critical mass' necessary to harness the collective intelligence of DSI organisations** to solve large-scale European social problems.

In the **DSI network dataset,** there are a total of 1000 organisations with a total of 630 shared projects, as of 20th December 2014. This dataset is likely to fairly represent the empirical phenomena at hand with two caveats

1) It has a bias towards English speakers as the survey was not translated into other European languages
2) tAs outreach was directed by the partners it is likely to reflect their social networks in more depth than disconnected social networks. However, it is a large sample and thus worth exploring in detail. The graph of the networks is given in Figure 11 (which shows the complete network, including disconnected communities), with a closer look at the connected centre in Figure at page 52.

**Crowd-mapped DSI organizations as a network**



# 3.1 WHAT COMMUNITIES OF SOCIAL INNOVATION EXIST IN EUROPE?

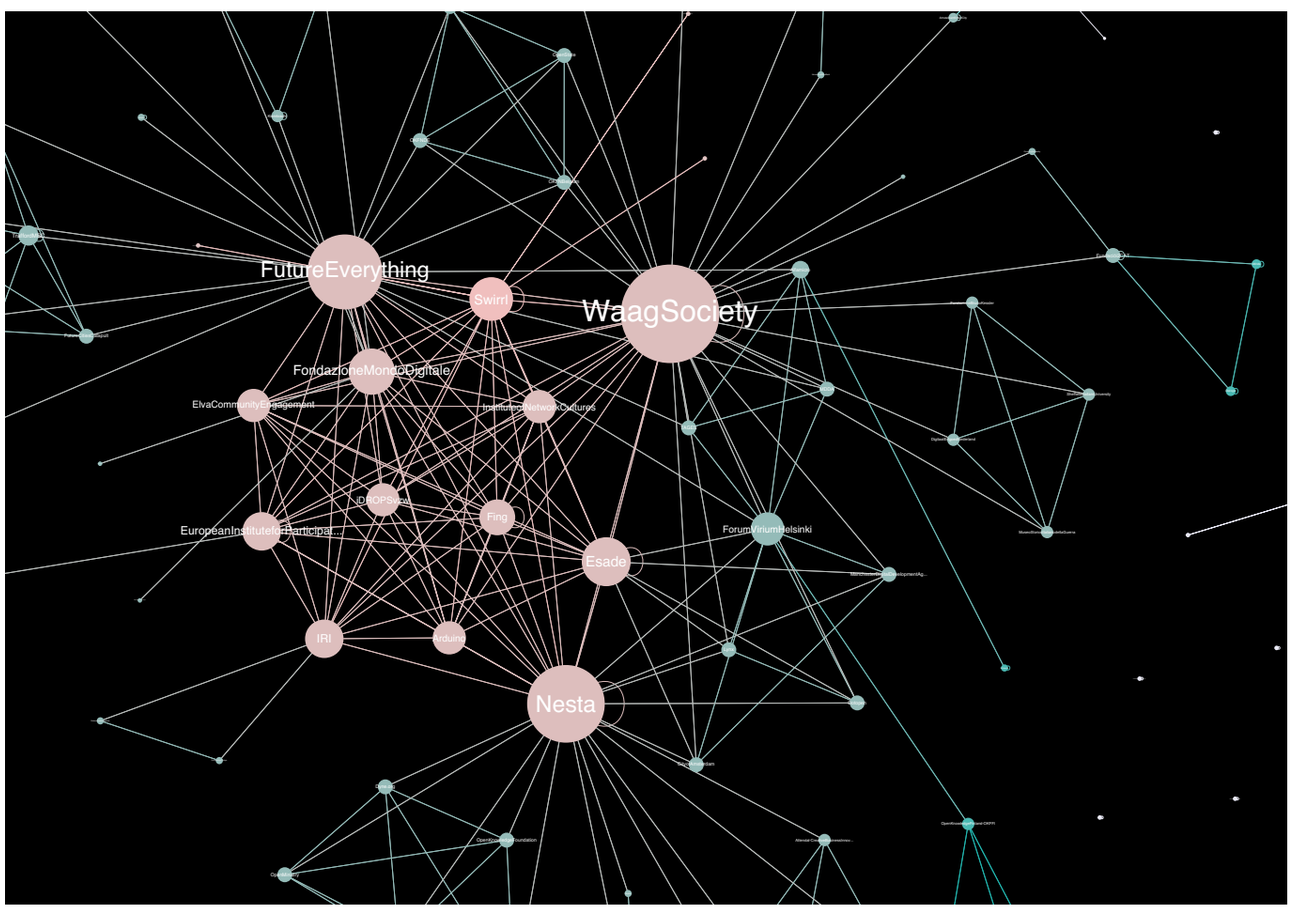
Is social innovation done by a few large actors? Or evenly distributed between various actors? Or is it done by a few large actors in concert with a large mass of smaller groups? The answer is social innovation in Europe is currently done by a few large actors in concert with a large mass of smaller organisations, but the majority of social innovation actors in Europe are disconnected from these networks. We map every organisation's *degree,* which is, for a given node (organisation), the number of connections (links) it has with other nodes (organisations). There are 243 organisations with connections to other organisations (26 per cent). The average number of connections between organisation is fairly small, only three.

Looking closely at the map, there are approximately 115 distinct *disconnected communities* of social innovation. Although there is one large pan-European network, there are also many smaller communities that do not have connections to the larger cross-European digital social innovation "super-community."

Attempting to detect communities in the figure below, a few large communities stand out from each other (Blondel 2008). These interconnected communities only count for 28 per cent of the total amount of connected DSI activities. The largest community (10.29 per cent) is focussed around open hardware and open networks and includes organisations such as iMinds, Fairphone, the City of Amsterdam, and Fab Lab Barcelona. Its most interconnected member is the Waag Society, and there is a large focus on awareness networks and new ways of making. The collaborative economy and open knowledge is the specialty of the second largest – but also more scattered – community (7.41 per cent), consisting of Esade, the IRI, European Institute for Participatory Media and the Institute for Network Cultures.

A third large community is grouped around Nesta (5.35 per cent) and is focussed on funding, acceleration and open democracy, although it has a very diverse technology focus, containing groups such as Open Ministry, Nominet and Mozilla. Open data for open access is the last dense community (4.95 per cent), with a centre on FutureEverything, but also containing open knowledge and its local chapters – as well as city councils working on open data, such as Salford in the UK. Interestingly, although the open hardware network is the smallest overall, it is the most highly interconnected and intermixed with open networks. Open knowledge is the most popular technological focus of DSI, but it also the most spread out and disconnected. Other communities, such as those around open data, are developing connected communities. Nonetheless, the vast majority of communities are not interconnected.

**Zoom-in on centre of DSI Network**



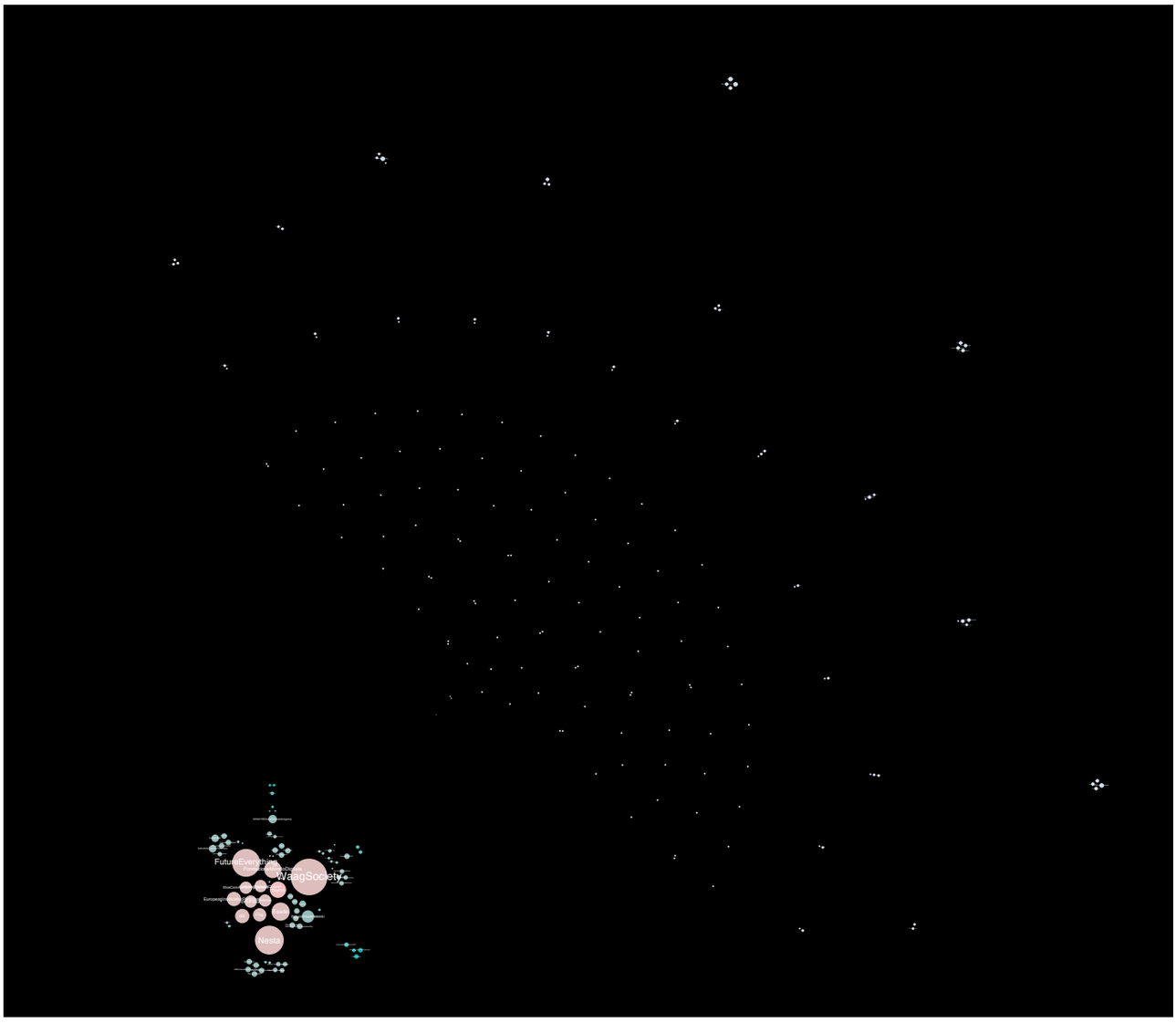
# 3.2 WHICH ORGANISATIONS CURRENTLY BRIDGE THE VARIOUS COMMUNITIES?

How can we determine which organisations act as crucial "bridges" between different kinds of networks and areas in DSI? Using **betweenness centrality** (Brandes, 2001), central organisations are: Waag Society, Nesta, Future Everything, Fondiazione Mondo Digitale, Kreater Social Innovation Agency, Forum Virium Helsinki, Swirrl, Open Knowledge Finland, IRI, BettterPlaceLab, Alfamicro, Amsterdam Smart City, European Institute for Participatory Media and ESADE. Each bridging of these organisations brings over 70 organisations.

Who connects the diverse communities, such as those of open data, open knowledge, open hardware and open networks? Even if an organisation is not central and so has only a few links, it may be these few important links that connect otherwise disconnected communities. With eigenvector centrality, we see that a number of new organisations are crucial in bridging diverse communities outside of the original list of central organisations which bubble up to the top: Institute of Network Cultures, iDROPSzw, Elva Community Engagement, Arduino, and Fing.

To encourage cross-hybridisation of different kinds of social innovation, special effort should be made by the European Commission to strengthen these digital crucial connectors between diverse DSI communities. Interdisciplinary European projects that force diverse communities to work together would strengthen the overall resilience of DSI in Europe by combining open hardware, open data, open knowledge and open networks.

**Automatically-discovered communities in DSI network**

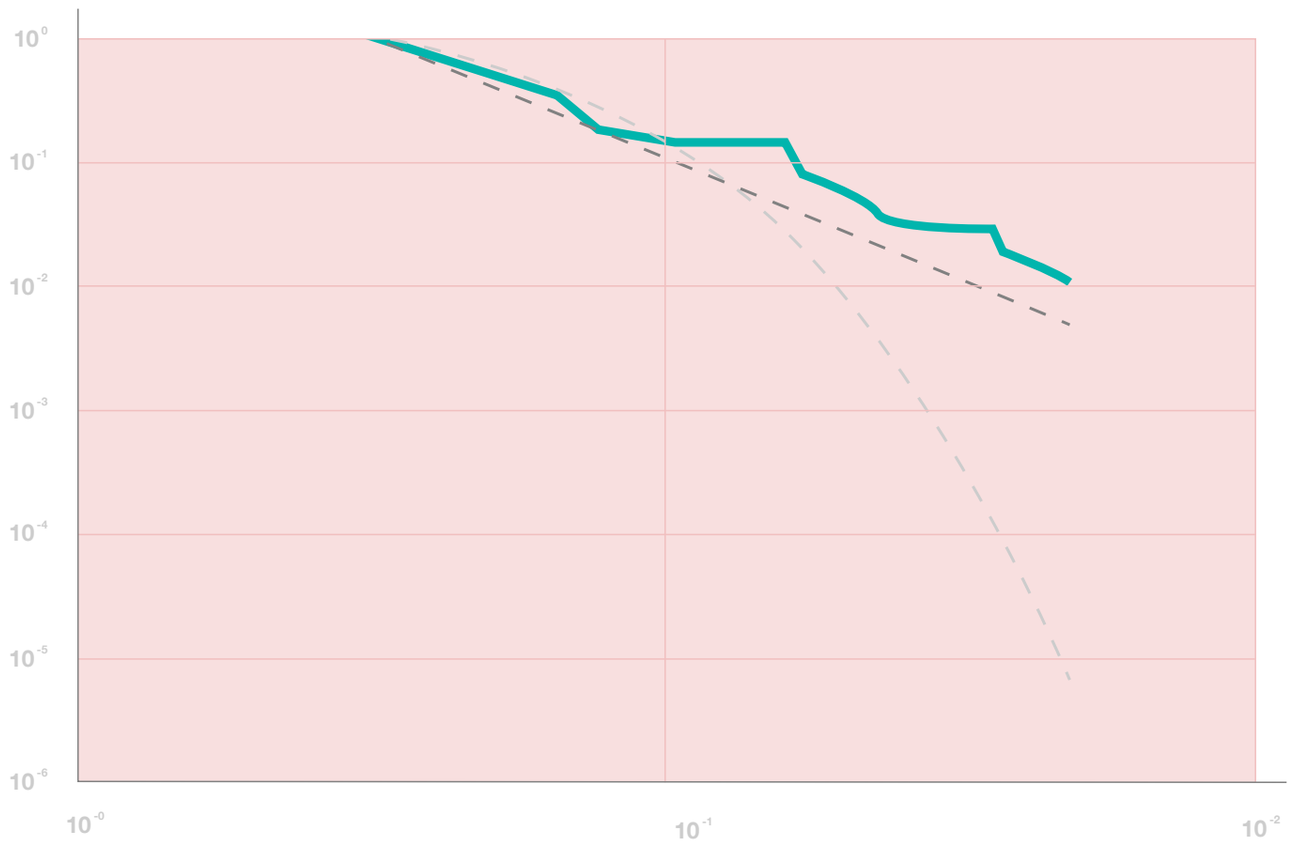


## 3.3 WHAT ARE THE CONDITIONS FOR SCALING DSI?

Successful actors in DSI have managed to leverage large networks using the Internet in order to accomplish innovation at scale by the network effect. We can define scale in terms of 'scale-free', namely that the distribution of DSI should undergo the *phase shift* typical of complex systems from a disconnected network to the 'scale free' network is often seen in organically developing eco-systems and is thought to be a sign of efficiency and resilience (Boisot and McKelvey, 2011). Encouragingly, we are seeing what appears to be an emerging power-law, the key sign of a 'scale-free' network, in digital social innovation in the data in Figure 4, at least for organisations with more than 3 connections. When tested rigorously, a power-law was indeed a strongly better fit *($p < 0.01$)* than an alternative distribution such as the exponential distribution that has only a few big winners such as the United States (Clauset et al., 2009).

The reason digital social innovation has not yet scaled is because the 'long tail' of smaller European DSI Networks is still heavily disconnected, with 687 organisations out of 930 (74 per cent) that have **no** links to other organisations. Many of these organisations are also in countries without much support, such as those in Eastern Europe. Looking at the data, if we want a single scaling European DSI network, an additional magnitude more of links (approximately 350 links) is needed to gather all the disconnected organisations to a single European network and encourage new communities where there are currently none. This is probably too many connections to be made via traditional European projects, but via a recommendation system a future version of the Digital Social Innovation website could introduce innovators to both other local innovators and innovators sharing similar interests across Europe to 'bootstrap' these connections. By connecting the currently isolated innovators, we should be able to achieve the necessary *phase shift* so that the scaling power of the heavily interconnected innovators is replicated across Europe by currently isolated innovators and communities.

**Comparing the power law distribution (dark grey) to exponential distribution (light grey against the real actual network data (turquoise).**



# 4

# REINVENTING INNOVATION POLICY


***4.1***

***Innovation Policy at a European level***

***4.2***

***Open and participatory policy making***

***4.3***

***Growing and scaling Digital Social Innovation***

***4.4***

***The beta “bottom-up” policy workshop toolkit***

# 4.1 INNOVATION POLICY AT A EUROPEAN LEVEL

Innovation and innovation policy are not new to the European Union. Delivering on the Europe 2020 objectives of smart and inclusive growth depends on research and innovation as key drivers of social and economic development and environmental sustainability. The European Commission has announced an ambitious **Digital Single Market Package** that will create the conditions for a vibrant digital economy and society by complementing the telecommunications regulatory environment, modernising copyright rules, simplifying rules for consumers making online and digital purchases, enhancing cybe -security and mainstreaming digitalisation.

**The Digital Agenda for Europe**[20], **Innovation Union**[21], and **Horizon 2020**[22] present an integrated approach to help the EU economy become more competitive, based on sustainable and inclusive growth fuelled by energy and resource efficiency. GDP slw-down since mid-2011, environmental disasters, climate change, an ageing population and growing unemployment will require innovative solutions that challenge traditional ways of doing things.

To provide a synthetic overview, we categorise two broad approaches for the EC programmes and initiatives to foster ICT-driven innovation.

**In the context of the future of DSI in Europe we suggest that an integrative approach is needed. This means that a combination of some to- down actions and botto- up approaches could result in successful digital social innovation policy.**

**Grassroots Innovation in Europe: adapted from Sestini, F**

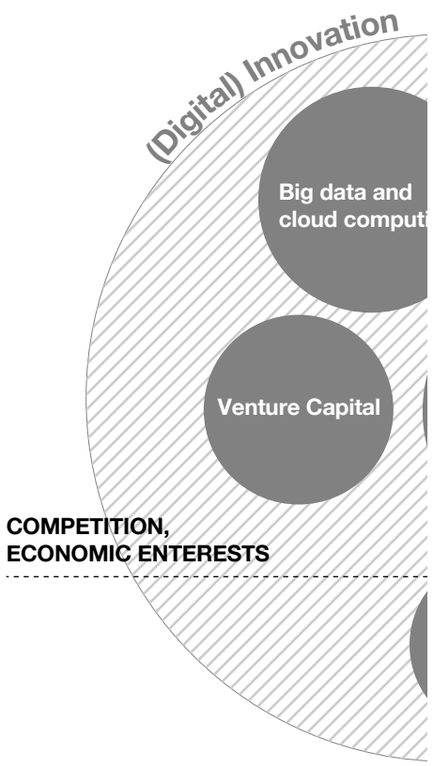
**Top-down and systemic approaches**

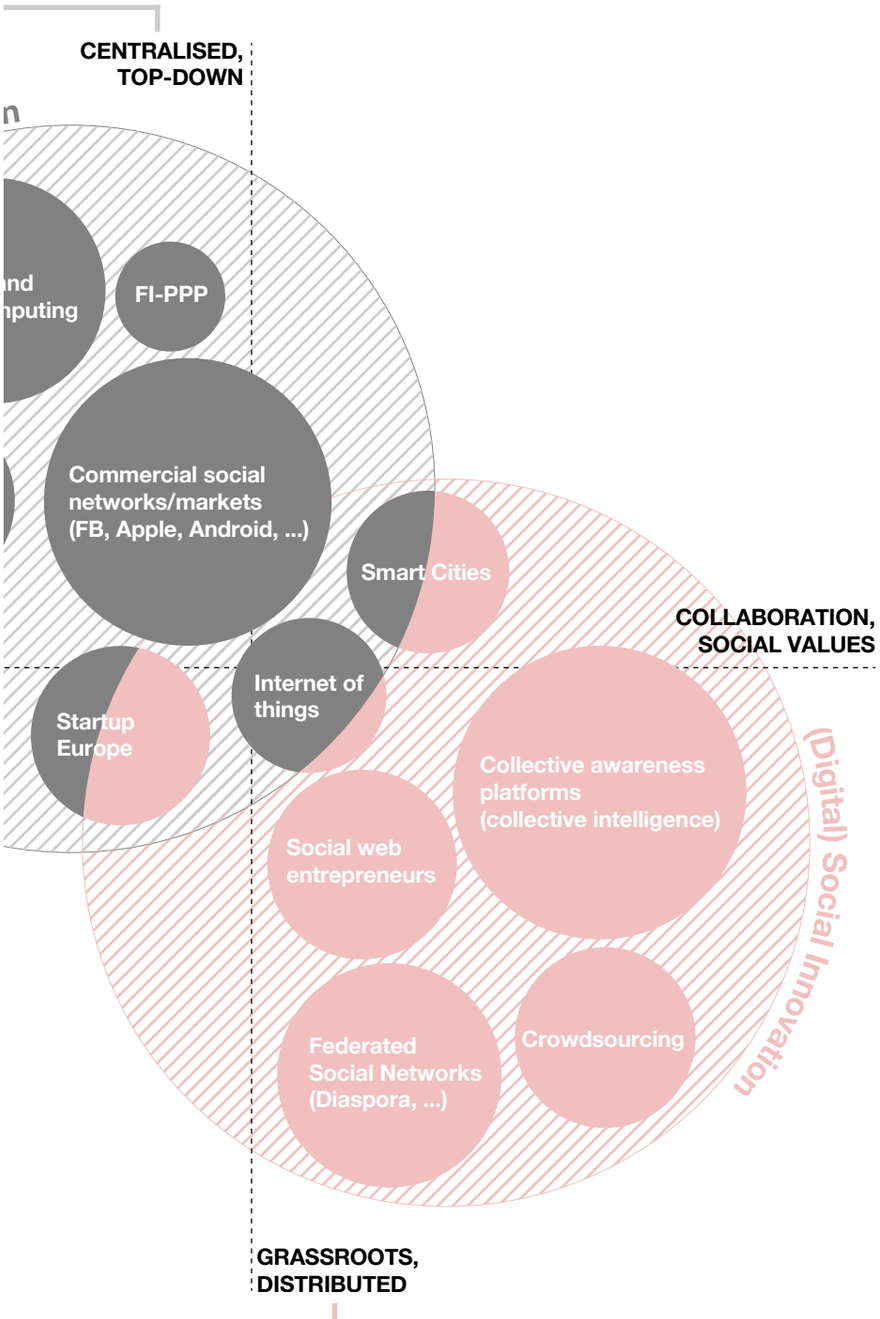
The most relevant initiatives are the **European Innovation Partnerships, Smart Cities, the Future Internet Public-Private Partnership Programme (FI-PPP), and the European Cloud Computing Strategy**. Their main goals are to promote and standardise pan-European technology platforms, as well as the integration of the relevant policy, legal, political and regulatory frameworks. As outlined in the Digital Agenda for Europe, these are prerequisites for the creation of a **European online Digital Single Market (DSM).**

The development of the Future Internet is mainly addressed through a number of technical projects, such as the **FI PPP**[23] and the **5G PPP**[24]. There are also a number of projects in the areas of **eInclusion, eHealth, participatory planning**, and **eGovernment**.

A **EU Big Data strategy** is becoming a priority for the competitiveness of European industries. In this framework the EC is promising to launch a multi-million euro **Public Private Partnership on big data** with industry. The focus is business driven, with little attention to societal challenges or to the inclusion of civil society and bottom-up approaches. However, the call for the creation of an **open data incubator** within Horizon 2020 aims to help SMEs set up supply chains, and to get access to cloud computing and legal advice. Further support, investment advice and funding oppertunities for SMEs and young companies are also available through the **Startup Europe programme**.

Other activities are happening in the **Internet of Things (IoT)** focus area, where the **IERC- Internet of Things European Research Cluster**[25] coordinates a variety of IoT R&I projects.






**Bottom up and grassroots approaches**

A counterpoint to the top-down strategy is the bottom-up, human-centred approach that is characterised by emergent forms of community intelligence. Relevant bottom-up initiatives are the **Collective Awareness Platform for Sustainability and Social Innovation (CAPS**), Web entrepreneurs, young entrepreneurs in the field of active and healthy ageing, digital champions, innovation camps and so on.

In particular CAPS facilitates SI processes and democratic decision-making through distributed platforms that foster collective intelligence and leverage the potential for crowdsourcing, citizen science, open democracy, and the collaborative economy. These platforms based on open technology can gather and integrate information in order to allow participation and citizens' feedback, as well as integrating peer information and sensor data to improve collective wellbeing.

Furthermore, there are initiatives in the area of open access, such as **Global System Science**, providing scientific evidence to support civil society to collectively engage in societal actions and policy-making. Another relevant initiative is **Digital Science**, which has synergies with **Art & ICT**, and promotes a conscious dialogue between technology, the Arts and societal issues to expand our understanding of technology in today's societies.

Finally, new initiatives launched in **Horizon 2020 on Human-centric Digital Age** and **Responsible Research and Innovation**, aim to promote societal engagement, gender equality in research and innovation content, open access, science education and ethics across all research initiatives.

# 4.2 OPEN AND PARTICIPATORY POLICY MAKING

Innovation should no longer be the result of top-down push technology strategies but of a more holistic and horizontal way of working. A shift from closed innovation inside the boundaries of institutions to **open and participatory innovation** is required.

**Open** means that innovation does not only belong to the industry sector but should also include other and different actors such as developers, entrepreneurs, social activist, and governments at different levels. **Open public policy** represents an iterative problem solving process in which inflows of knowledge from external actors as well as participatory decision-making processes equip policymakers with a generative capacity for developing novel policy solutions.

**Participatory** means that the policy environment contrasts with more traditional innovation policy frameworks, where there is a strong focus on the market perspective and competitiveness. Though digital networks can give rise to new forms of collective intelligence and can increase democratic participation into policy debates, the actual influence they exert on policy decisions remains unclear. The reality of policymaking can often be laborious, lengthy and involve lots of compromises along the way. But participatory policymaking should begin with engagement with those who are likely to be affected by the end policies.

Thus, in formulating new policies ideas for Digital Social Innovation, we adopted a participatory methodology trialled by **Digital Futures**, a DG Connect new approach to poliy making supported by the **Futurium online platform**[26].

Digital Futures is not about predicting the future or about pre-empting future policy decisions. It is a participatory visioning project aimied to co-develop long term visions (futures) and policy ideas to go beyond the Digital Agenda and Europe 2020, looking at three main pillars of the framework: visions (forecasting and back casting,; policies (actions and pillar); and agents (stakeholders in a broad sense, including implementers and decision makers).

The Futurium platform is based on the metaphor of emergent collective intelligence, and combines the informal nature of social networks with a methodological approach of foresights to engage stakeholders in the poliy making process. Besides the standard tools available in most social networks, Futurium participatory tools offer several features to support collective foresight, such as scenario building, collective debate and voting for policies.

Following the methodology elaborated by Digital Futures, a participatory policy workshop was held in Brussels at DG Connect on February 3rd 2014 (seebBeta bottom-up policy workshoptToolkit was used for the methodoloed). This experimental approach encouraged poliy-makers to go beyond the standard approach of deploying consultation documents towards a more user-centred approach to poliy-making that is participative in the generation of potential ideas. The workshop brought together over 70 DSI practitioners, researchers, experts, and poliy makers from different European countries, as it was very important for the DSI research project to facilitate this kind of experimentation.

As the main outcome of the workshop, **9 DSI policy areas** were identified and over **30 DSI policy ideas** emerged. Ideas were clustered together according to common themes, and the Table below shows the breadth of thinking. These areas of policy were further worked on during the day, with European Commission officials providing their responses to the ideas that emerged.

In the spirit of Digital Social Innovation after the workshop the debate continued online using the **Your Priorities platform**[27] to debate the ideas and to prioritise the ones that could be implemented at EU level. The key element of the platform is a simple but powerful collective debate system. Each point can only be 500 characters and people can mark points as helpful or not helpful resulting in a list of the best points for and against. Both sides of the argument are equally represented in the user interface and this is highly effective in facilitating consensus and in the inclusion of minority arguments.

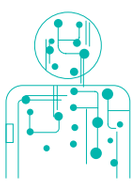
**DSI policy ideas generation: Crowdsourced Idea**

**COPYRIGHTS AND OPEN ACCESS**

**1. Open Standards for social, identity and payment data**

Many US companies have patents on identity, social and payment data. There is a need to require the European Public Sector and EC funded projects to not fall into this trap and provide open data sets, in particular on social identity and payment. Public data sets will remove barriers for social innovators who often rely too much on proprietary data.

**DIGITAL HUMAN RIGHTS**



**2. EU public Digital ID with citizen control**

Create a European standardised public digital ID for all citizens with guidelines and rules to ensure privacy, rights, and fundamental freedoms in the digital environment. Big Data and cloud companies but also States have a lot of control over an individual's online identity. By creating a standardised public Europe-wide digital ID would ensure individuals greater autonomy and control over their online identity.

ea

## FUNDING MODELS AND INSTRUMENTS

### 3. Time unding and crowdsourcing

People can use their time as asset and use mutual credit systems and alternative money in order to help projects go life. Time, trust and reputation are currencies that can be easily created and shared to maximise collective value within a social credit system.

### 4. Align EU R&I funding with EU Regional Funds to support the EU Strategy for DSI / CAPS

Streamline use of funds within a Europeans strategy to help scaling DSI/CAPS initiatives and provide a holistic framework to support them.

## CITIZENS ENGAGEMENT AND FEEDBACK

### 5. Democratic and distributed social network

Distributes and federated social networks based on open source code and open standards to promote open democracy, collective debate, deliberation and voting. I would call it Yups. com: Yups for the positive votes and Oops for the negative ones.

## SECTOR SPECIFIC REGULATION /DEREGULATION

### 6. Net Neutrality and banning software patents

Banning software patents and defending Network Neutrality will keep bottom-up innovation feasible and affordable. Software packages that are patented can be expensive, and less accessible to potential individual innovators. Also the Internet needs to continue to be a neutral space where creativity can continue to flourish.

### 7. Gender Equality in DSI

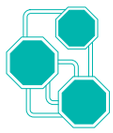
Promote gender equality and empowerment of women through ICT in DSI by tackling things such as criteria for funding, visibility ect. DSI disproportionately male dominated. Less diversity can hinder innovation, and women bring new perspectives while improving access to information, education and work opportunities for women.

## ECOSYSTEMS AND INNOVATION LABS

### 8. Establish a European Innovation Lab Network

A EU Innovation Lab network can to support, facilitate and scale more DSI projects. It can combat the lack of legitimacy and coordination of DSI initiatives within the EU by creating a space fostered by the EU Commission to support and promote DSI.

## ENABLING INFRASTRUCTURES



### 9. Funding a Public-Private-People Partnership (PPPP) on distributed architectures

The EU should promote to create an open decentralised digital ecosystem including open data distributed repositories, distributed cloud, distributed search, decentralised social networking, public identity management, and encrypted email service. The Internet ecosystem today is highly centralised The current Internet is dominated by a handful of mainly US companies that control all the layers of the ecosystem (app store, cloud, machine learning, devices), and are imposing their rules of the game. Europe needs to invest in future infrastructures that reflect the European values, support SMEs and civic innovators and deliver public good. Distributed, privacy-aware enabling infrastructures can also re-establish trust.

## IMPACT AND MEASUREMENT

### 10. Implement social value and social impact standards for policy evaluation

Implementing a common evidence framework based on social impact could change the way technology policy happens and it could pressure the EU to adopt beyond GDP measures.

## 4.3 SEVEN STAGES OF INNOVATION

As already established, Digital Social Innovation takes place in the context of a more collaborative, horizontal and cooperative environment. Although every real innovation is a complex story of loops and jumps, there are various stages that most innovations pass through.

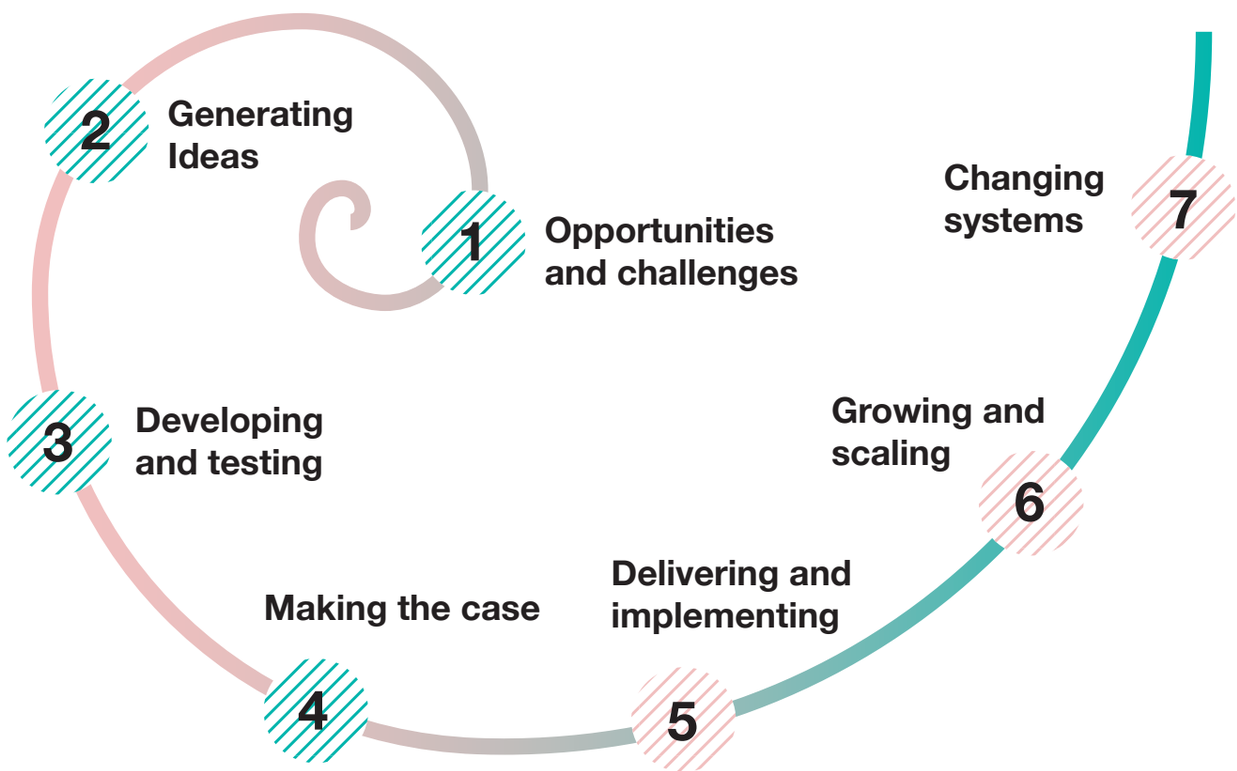
We use the **'Social Innovation Spiral'**, first developed by The Young Foundation in The Open Book of Social Innovation (2010), and then developed further by Nesta, as a methodology to guide the policy analysis and to identity the policy tools and instruments needed in the different innovation stages. The framework outlines seven stages of innovation that are not always sequential (some innovations jump straight into practice or even scale) and there are feedback loops between them. They can also be thought of as overlapping spaces, with distinct cultures and skills. The stages provide a useful framework for thinking about the different kinds of policy, tools, and support that DSI innovators need in order to scale and sustain. It is then possible to map the policy tools described in the next chapter to the different innovation stages, enabling DSI to grow and scale.

**The seven stages are:**

**Opportunities and challenges**:
These include all the initiating factors – for instance a crisis, new evidence, and inspiration.–, which highlight the need for change. This might involve diagnosing the root causes of a problem, or identifying the opportunities that a new change could bring about.

**Generating ideas**:
Most of the ideas you come up with at first won't work. But it's only through the process of constant idea creation that you arrive at something that is radical and transformative. Use creative methods like

**The seven stages of innovation**



design to increase the number of solution options from a wide range of sources.

**Developing and testing**:
New ideas are always helped by robust criticism. It is through trial and error that ideas are iterated and strengthened. This can be done by simply trying things out, or through more rigorous prototyping and randomised controlled trials.

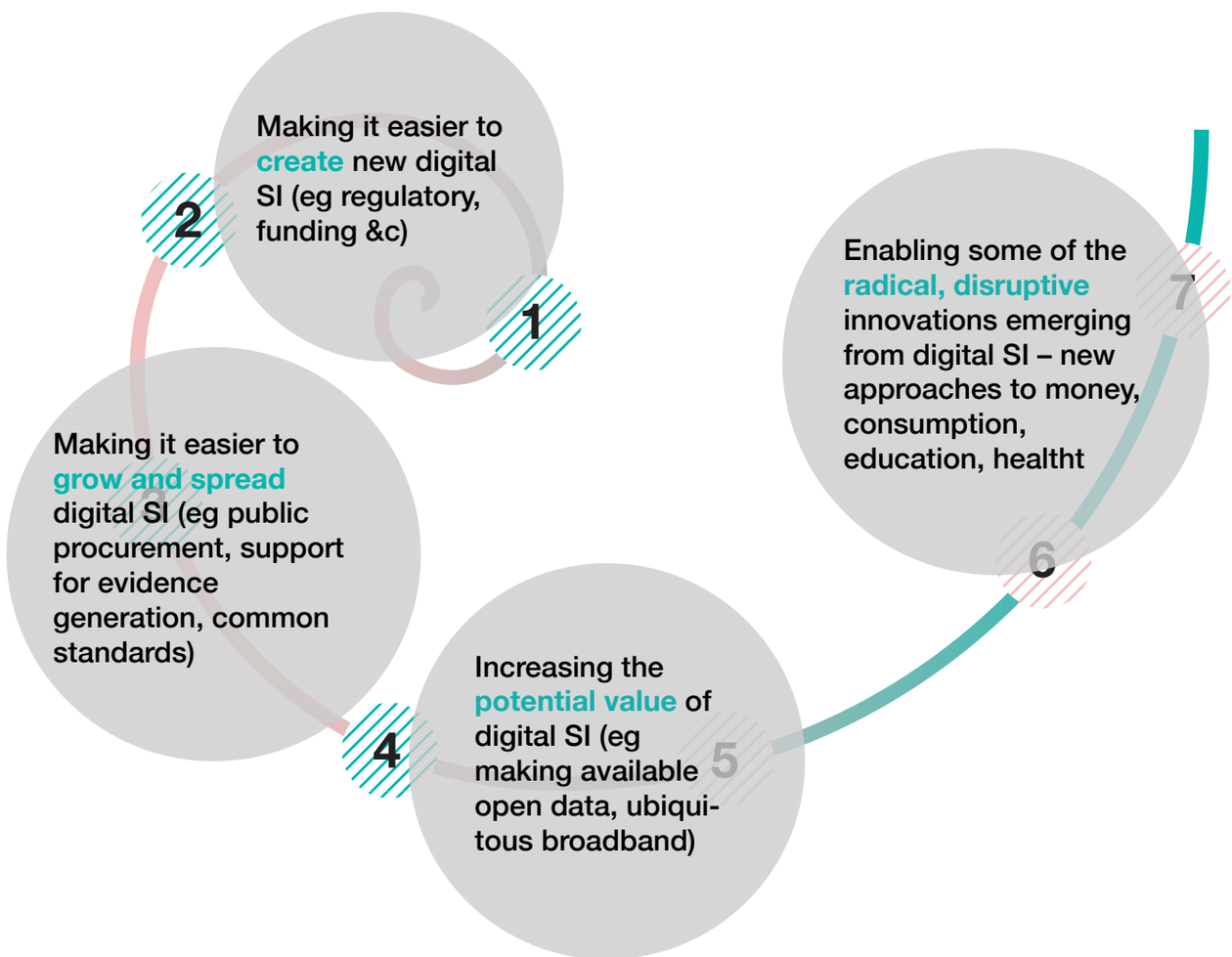
**Making the case**:
Before you try to implement your idea, you need to prove that it can work and is better than what is already there. Build up firm evidence to back it up and then share it honestly.

**Delivering and implementing**:
This is when the solution becomes everyday practice. It includes identifying what is working wel, and what isnot, as well as securing income streams that enable the lon- term financial sustainability to carry the innovation forward.

**Growing and scaling**:
In this stage there are a range of strategies for growing and spreading an innovation - from organisational growth, to licensing and franchising. Emulation and inspiration also play a critical role in spreading an idea or practice in a more organic and adaptive manner.

**Changing systems:**
Systemic innovation is where maximum social impact can be created. It usually involves changes in the public and private sector over long periods of time, and the interaction of many elements and new ways of thinking.

**Policy Goals**



# 4.4 THE BETA "BOTTOM-UP" POLICY WORKSHOP TOOLKIT:

As outcome of the DSI policy work shop, we have designed a Bottom-up Policy Toolkit for practicioners and policy makers to run participatory policy experiments that can produce innovative policy ideas and solutions:

**Step 1: Get a wide range of people in the room.**

The workshop should include practitioners, industry representation, academics and policymakers.

**Step 2: Start with live case studies from practitioners**

- people who run services and who know what the problems/challenges/ opportunities are. Make sure they represent a sample of the type of practice you are developing policy for and that they focus their presentations on what is important for people in the room. As an example, we asked each of our case studies to each prepare a five minute presentation covering the following:

*Project background, including key facts (such as when they were founded, turnover, number of users, size of organisation, employees etc)*

*What they were trying to achieve with their service, including any evidence they have of impact*

*Opportunities and challenges*

*What really helped them get their project of the ground and helped them to scale up their work*

*What the biggest barriers were that they faced and how to address them (through policy? Funding?)*

*If they could make three changes to EU national or local policy and funding mechanisms to better support projects like theirs, what would they be?*

*It is important that you leave at least half of the time for participants to ask questions from the presenters.*

**Step 3: Frame the development process.**

Highlight that there are a range of different policy tools to draw on (Laws, regulation, money, standards, skills) and give some sector-specific examples of policies that created a favourable impact. Point out that they don't all have to be big ideas or need to be expensive to implement, and acknowledge the often serendipitous innovation that emerges. (e.g. DARPA led to the creation of the internet, the R&D funding at CERN led to the invention of the Web) Encourage people to think about:

*Who could implement it (European Commission, national governments, municipal etc.)?*

*Who will benefit? What are the barriers? Who are the enemies of the idea?*

*Does it need money?*

*What work needs to be done to flesh it out?*

You may also want to promote the importance of evidence-based policy-making as a continual process of understanding what works (and what doesn't). Finally, it's important to acknowledge that policy may not be able to solve some problems. For example, often huge amounts of value can be created by industry bodies working to develop better standards or terms of trade that don't need governments to get involved at all.

**Step 4: Identify the problems/ opportunities.**

We asked everyone in the room to individually complete this template to quickly generate ideas:

**Step5: Cluster the ideas together.**

For a room full of 50+ people, this needs about an hour in length. We recommend that the workshop facilitator does this over a lunch break. With a diverse group of people in the room, you are naturally going to get a very diverse mix of ideas. Cluster them by the main problems they are trying to address. If you get more ideas than you have working groups, you can ask participants to 'dot vote' on ideas and choose the most popular themes for the working groups.

**Step 6: Get people into smaller groups to discuss the clustered ideas and further develop the best one or two.**

This should take approximately 45- 60 minutes. Appoint a facilitator to keep the conversation focused and a rapporteur to report back at the end. We reckon 5 is the minimum number of people needed. More than 12 and you'll struggle to let everyone have their say.

**Step 7: Plenary. Ask people to report back to the re-convened workshop.**

Prime some attendees to give a response to the ideas presented. We asked actual policymakers to give their responses to ideas and we also asked the presenters to give their feedback. Finally, test out with the people who presented case studies in the morning to check the ideas are useful.

**Step 8: Summarise the day and issue a call to action.**

Encourage people to take their ideas forward. We're using Your Priorities as a platform to promote the ideas to others. You might want people to pledge some action. We asked attendees to write their pledge for how they'll develop their thinking on digital social innovation and told them we'll email their pledge back to them after six months (this keeps people on their toes and allows us to re-engage with them after that time).

**Step 9: End on a high.**

Thank everyone of course. All through the process, re- member the golden rule of. running workshops – find engaging presenters with useful information for their audience, lots of participation, encourage networking, focus on action and good coffee.

# 5

# POLICY TOOLS AND ACTION

***5.1***

***Economic instruments***

***5.2***

***Regulation and Legal frameworks***

***5.3***

***Research and Innovation support***

***5.4***

***Dissemination & learning***

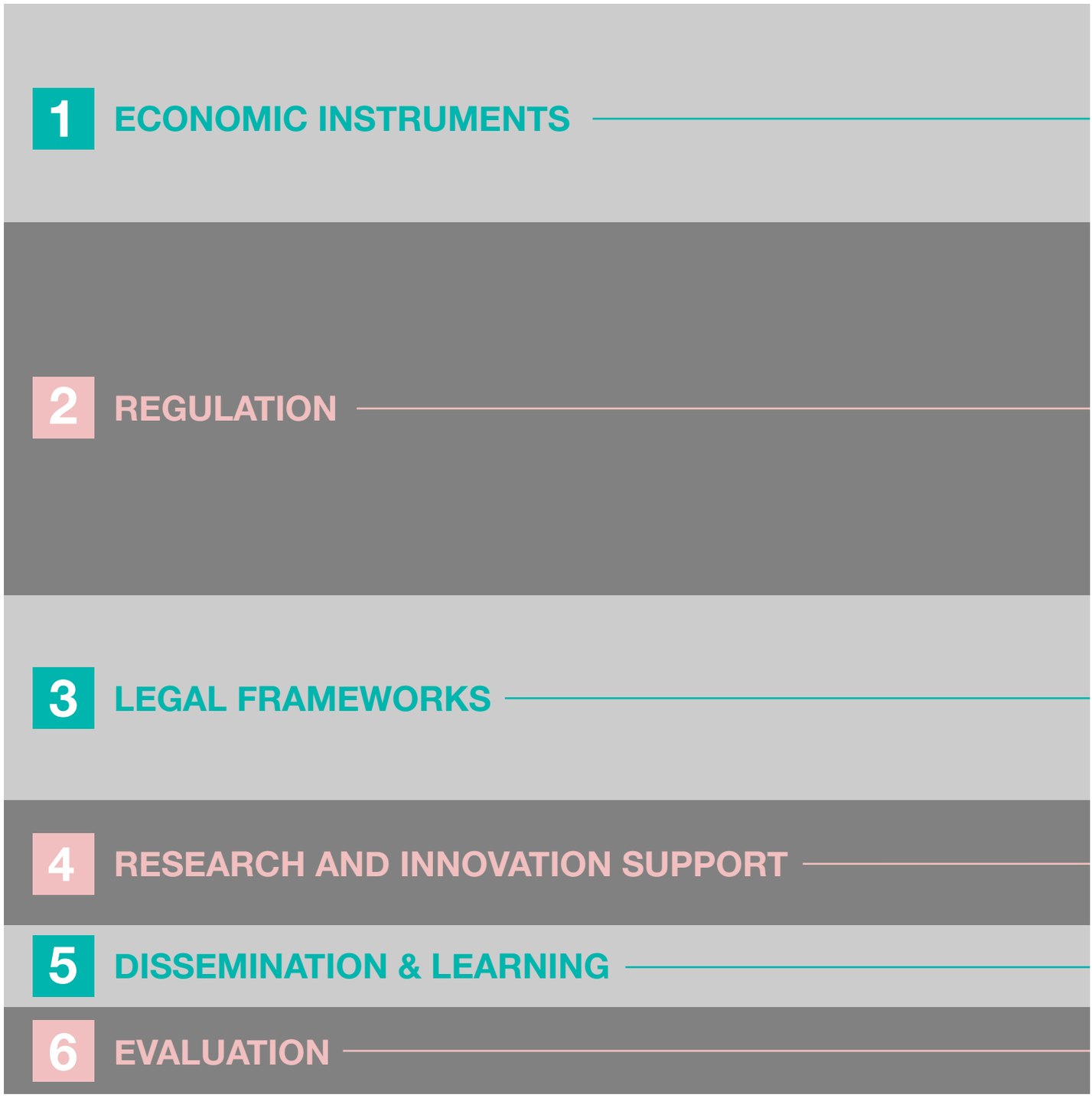
***5.5***

***Evaluation***

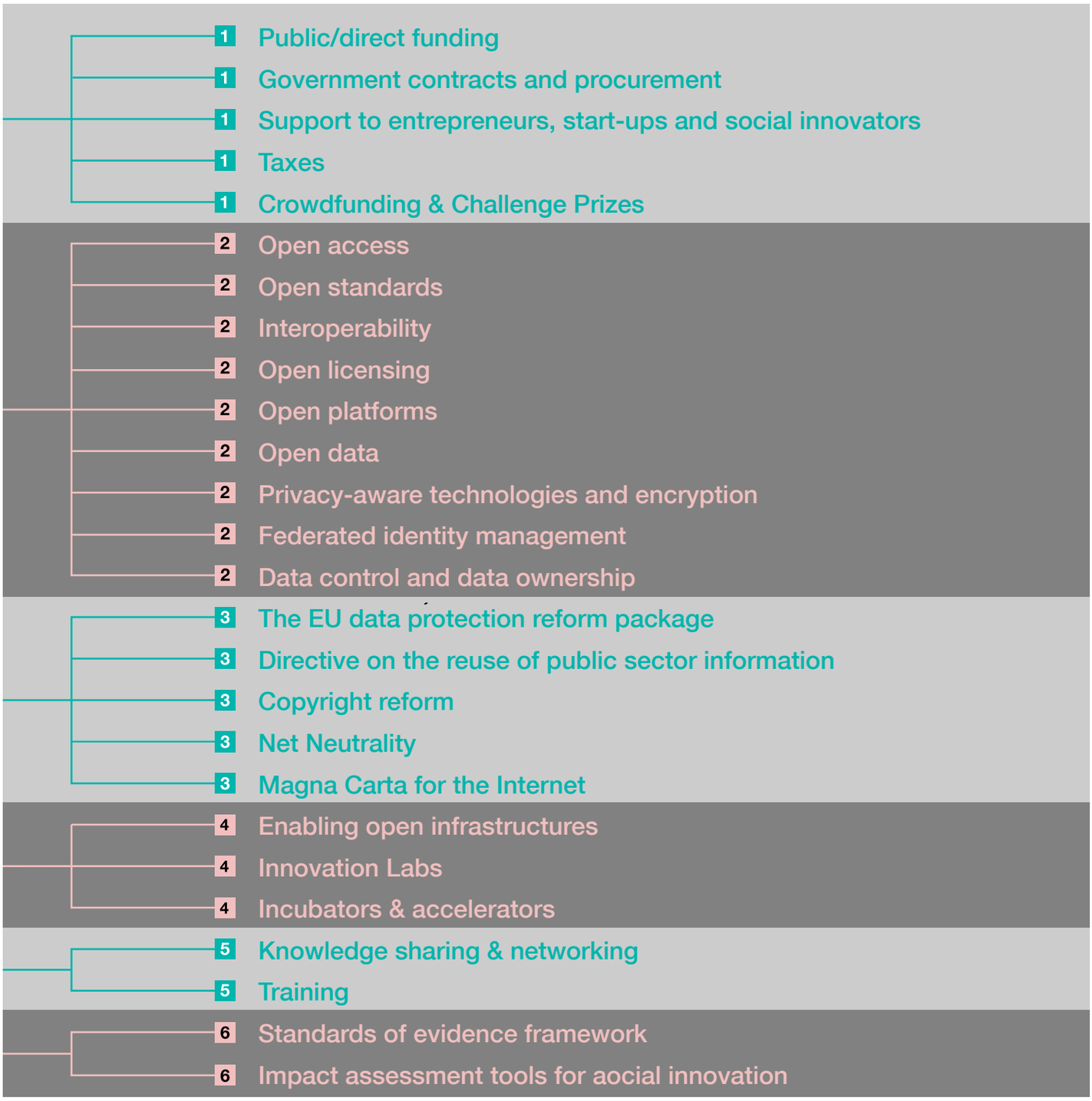
In order to implement future DSI policy goals and strategies, several tools and instruments have to be deployed.

It is important to state that **most policy influencing DSI will be at national, regional and local level.Iit will also be sector specific – i.e around health, money, and education**. However, the European Commission has also very relevant competences, and some regulatory and policy issues are cross-sectoral and should be harmonised and coordinated at EU level

**Policy Tools**



There is a common sentiment that **a strong public intervention at EU level is needed** to properly support, coordinate, and harmonise these areas whih, have so far been left to isolated developers, activists and hackers. **Recognising DSI's strong social value**, besides its strategic contribution to repositioning Europe worldwide, and promoting a coordinated approach to its development, would allow a whole **new generation of digital social innovation to start in Europe**.



# 5.1 ECONOMIC INSTRUMENTS

Economic instruments include public funding (direct funding for projects, subsidies etc.), as well as public incentives such as tax treatment of activities. Seed funding and crowdfunding are also two important instruments.

Although previous analysis and policy actions[28] focus on the role of VC or business angels, what we have observed is that in the very early stage of a sector's development, it has been mainly public funds that have prompted innovation.

The US Federal Government spends 2.6 per cent of a much larger per capita GDP on research compared to only 1.3 per cent on average in the EU. Early-stage funding for innovation is also more heavily supported by government investment and subsidies in the USA than the EU. Approximately eight times as much public as private business investment goes into early stage technology development in the USA. In the EU investment in research and technological development is more market-based – and demonstrably less effective (FINNOV European Policy Brief).

Another additional public intervention is the establishment of public incentives regarding tax treatment of activities. According to OECD, there are four main tax incentives directly linked to research and development: volume-based R&D tax credits; incremental R&D tax credits; hybrid volume and incremental credit; and finally R&D tax allowance.

## PUBLIC/DIRECT FUNDING

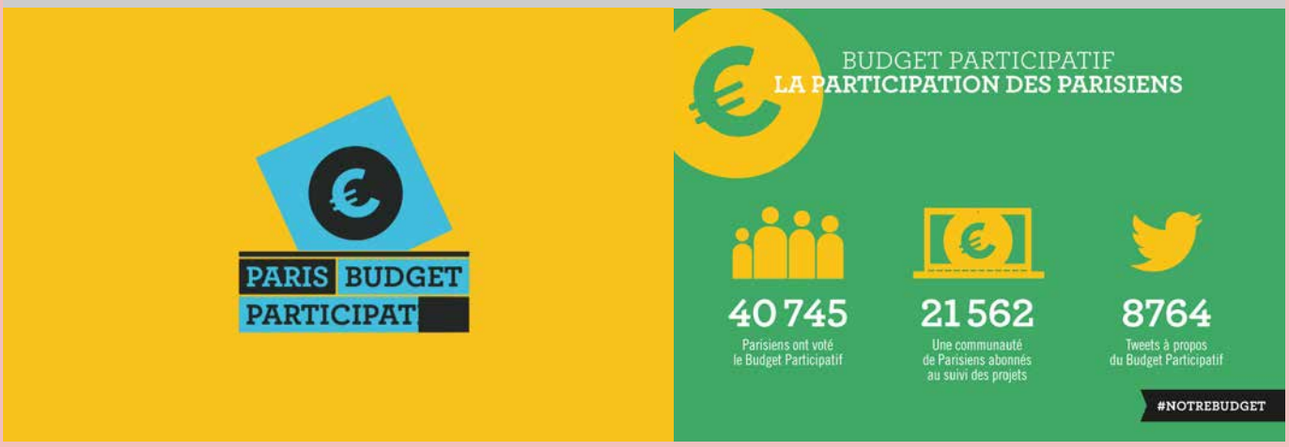
Many governments have now created funds open to bidding for innovative projects in society, sometimes emphasising new ideas, sometimes emphasising formal experiments (like France's Fonds d'Expérimentation pour la Jeunesse) and sometimes emphasising scaling. Good examples are the R&D EC programmes, SBRI funds in the US, SITRA in Finland, and Vinnova in Sweden, or the UK's Big Society Capital fund and India's Inclusive Investment Fund. They combine investments in new hardware and software with experiments to discover better ways of delivering healthcare or reducing carbon emissions.

### Public funds and actions for social innovation

President Obama set up an **office for social innovation in the White House**, with a fund for supporting NGOs. **In Seoul, the Mayor has designed programmes for the sharing economy and citizen engagement. Colombia set up a centre for social innovation** within its government, focused on action to alleviate extreme poverty, while **Alberta in Canada committed to a $1 billion social innovation endowment**.

### Participatory budgeting

As a way to enhance citizen participation in the way public finance operates there are important **Partcipatory Budgeting initiatives being** experimented with by local City Councils. For instance In Paris between now and 2020, residents will decide how €426 million is spent, which corresponds to five per cent of Paris' municipal budget. Participatory budgeting has been successfully employed also in other European countries such as Estonia and Iceland[29], as well as around the world – for instance in more than 100 Brazilian cities[30] and in New York City[31] .



## GOVERNMENT CONTRACTS AND PROCUREMENT

Government contracts and procurement should include new actors and new formats to enable government products and services to be open sourced. This means introducing elements of open innovation into the procurement process, involving purchasing departments in the sourcing process in order to ensure that technology (i.e. free and open source software) can be obtained at a lower cost with a better quality from reliable suppliers, and that open standards and interoperability are implemented. In effect, open source software should be easy to acquire from government at all levels.

### Open source procurement

As an example, in 2004, the UK government launched (and reviewed in 2009 and 2010) its policy on ICT[32] where special attention was paid to **open source procurement**. In this respect, a toolkit was used to ensure that there is a level playing field for open source and that some of the myths associated with open source are dispelled. Participating in open procurement calls should be made easy.

Commissioning tools could also be set up to see if the deployment of the DSI strategy across Europe is meeting the needs of their target beneficiaries (entrepreneurs, business, developers, citizens and other communities). A priority rank of outcomes could be established to see if the delivered products and services by the EU are achieving their goals and if providers are able to deliver their outcomes.

### Public procurement of innovative solutions

In January 2014, the European Parliament adopted new public procurement directives and these are some examples of the main changes[33]: increased flexibility and simplification on the procedures to follow, negotiations and time limits; clearer conditions on how to establish collaborative or joint procurement; and the creation of innovation partnerships. A review of procedures in public procurement is needed in order to include actors from grassroots communities.

## SUPPORT TO SOCIAL ENTREPRENEURS & START-UPS

Supporting programmes for grassroots communities of innovators (such as CAPS) and start-ups should be considered in the future DSI policy. There are many supporting programmes around the world. Good working instruments can be **PPPs (public-private partnerships)** or **European innovation partnerships for DSI**, as well as using the **SME instrument** in order to help small and medium-sized enterprises. DSI should also create new specific instruments for social entrepreneurship.

### Development and entrepreneurship programmes

In public institutions there are examples such as the **New York City Economic Development Agency** and in particular its **entrepreneur programme**[34]. Very similar to this, is the example of **Barcelona Activa**, which is the local agency for employment and economic growth for the area of Barcelona[35].

Some other examples come from private organisations. One of the most well-known is the Google-supported programme Google for Entrepreneurs[36] that in 2011 created a campus where innovation and start-ups can meet and share a creative space. Currently there are campuses and partnerships across 125 countries.

## Impact HUB

The **Impact Hub of Vienna**[37] is a network of several cities across the world which, according to their websites, "inspire, connect and enable individuals and institutions around the world to sustainably impact society". Results from 2012, shows that more than 400 ventures were started among its members.

## TAXES

One of the most obvious measures is to **crackdown on tax abuses** by technology companies. Big non-EU technology companies directly benefitted from taxpayer-funded technologies to develop their market innovations, but they have strategically underfunded the tax purse that helped lead to their success. If the big network companies do not pay their taxes it disadvantages European SMEs and social organisations.
The European Commission has committed to deliver an **Action Plan on efforts to combat tax evasion and tax fraud** in 2015. This would include measures at EU level in order to move to a system in which the country where profits are generated is also the country of taxation. This would include automatic exchange of information on tax rulings and the stabilising of corporate tax bases.

## Tax incentives for R&D and innovation

In terms of SMEs and DSI initiatives, there are existing **tax breaks** linked to traditional R&D policies. The OECD is a good source on the different types of tax breaks that are most often used across Europe[38]. Any specific incentives to support innovation should apply not only to digital firms but also to non-digitial firms.

## CROWDFUNDING, SEED FUNDING & CHALLENGE PRIZES

**Crowdfunding** should be included in thinking about the future of DSI. The European Commission should start promoting more crowdfunding tools, involving the community in choosing the best projects to be funded, as part of their R&D programmes.

Crowdfunding allows people to have the opportunity to support what they consider to be an attractive idea and to help someone else's dream to become a reality, while simultaneously getting benefits from the new product, eciprocity being one element of crowdfunding.

A report published by Nesta and University of Cambridge in November 2014 forecasts the **growth of alternative finance** (including peer-to-peer business lending, peer-to-peer consumer lending, equity crowdfunding, community shares, pension-led funding and invoice trading). In 2012, more than $2.7 billion was raised through crowdfunding worldwide – helping to fund more than one million new projects.

The main crowdfunding platforms are **Kickstarter** and **Goteo** but there are also plenty of other platforms that are gathered in the directory of crowdfunding platforms **CrowdingIn**[39], operated by Nesta (in the UK).

## Crowdfunding platforms

In Spain, the first platform to be launched in 2010 was **Lánzanos**. **Verkami**, which in esperanto means "creation lovers". Here, artists, designers, entrepreneurs, cultural promoters and creators can present their project and be funded within the period of 40 days with the help and involvement of the public.

**Crowdfunder.co.uk** in the UK has raised £2.4 million of funding for projects since it launched. The platform specialises in supporting community enterprises, creative startups and charities. Another example is **Spacehive**, which focuses on public space and community projects in the UK.

The platform **Citizinvestor** is an American portal where public projects – such as new bins in the city, or high bike racks, or playground installations – are funded by citizens themselves.

**Seed funding** is a very early-stage investment, meant to support the business until it can generate cash of its own, or until it is ready for further investments. Seed money options include friends and family funding, angel funding and crowdfunding. Seed funding is mainly aimed at start-ups and ventures.

There are other elements such as **prizes, competitions, events, knowledge sharing and dissemination** that should also be included in the mechanisms for DSI policy.

**The Nesta Centre for Challenge Prizes** has run prizes in everything from energy to waste, data to education. In 2014 Nesta revived the 300 year old **Longitude Prize** and

involved the public in choosing which of six big global challenges deserved to be the focus for a new £10 million prize fund[41]

## Challenges&Prizes

The Open Data Challenge Series[42] is a collaboration between Nesta and the Open Data Institute and has been very successful, attracting developers and social entrepreneurs to develop innovative solutions to social challenges using open data.

The **European Social Innovation Challenge**[44] was launched by the European Commission in 2013 in memory of Diogo Vasconcelos, to encourage new social innovations from all over Europe. The competition invited Europeans to come up with new solutions to reduce unemployment and minimise its corrosive effects on the economy and society. The three winning projects were awarded financial support of €30,000

# 5.2 REGULATION AND LEGAL FRAMEWORKS

The second package of tools encompasses **different aspects of regulation** that need to be reviewed or adapted in order to provide an environment conducive to openness and collaboration, while preserving citizens' rights and data protection. One of the first steps of DSI policy implementation should be to **integrate new legal approaches to open access, open standards and copyright reforms**. Future DSI policy could also initiate a process where we are able to rethink notions of privacy, trust and collective value creation for the public good in order to **strengthen the public domain and the creation of knowledge commons**[45].

An important general issue is to conceive transparency/open data and privacy/data protection as complementary issues and not as opposites. In fact, the right to data protection and privacy, as given in both legal frameworks (such as data protection) and technologies (such as encryption) should apply to individual citizens. Conversely, institutions – and in particular public institutions and work done with public money – should be open and transparent.

There are more specific regulatory instruments that could be key in enabling the growth of DSI across Europe:

## OPEN ACCESS

Access to knowledge is a founding principle of any democratic society. Regarding open access to scientific results the EC is promoting a comprehensive open access policy[46], so that results of publicly-funded research across the EU Framework Programme for Research and Innovation can be disseminated more broadly, for the benefit of researchers, industry and citizens. Academic papers, usually funded by public money need to become open access by default to increase scientific knowledge across Europe. Scientists should be encouraged to openly publish not only papers but also datasets, so experiments can be replicable.

## OPEN STANDARDS

**t**The Digital Agenda emphasises the need to adopt **open standards and interoperable solutions** to fully exploit the development of existing and emerging technologies. Open standards should be at the core of the technical infrastructure. Open standards should have an adequate legal and governance backing, such as the **Royalty-Free Patent Agreement** of the W3C[47]. Open standards are essential to deploy interoperability between data, devices, services and networks.
Standards will enable new business models for co-operation between multiple stakeholders such as companies, public authorities and citizens to develop meaningful technologies. Therefore, greater citizen involvement in standards should be supported (for instance the W3C has proposed a Webizen programme: https://www.w3.org/wiki/Webizen) and citizens should be able to initiate new standards, not just large companies or states. Furthermore, citizen-based work on standards should be supported by public funding and all public-funded software should use open standards. For a definition of open standards, see **OpenStand Principles**[48]

## OPEN LICENSING

Public sector information should be made available under an open knowledge license or placed into the public domain, so that innovators can build data mashups on top of a distributed data infrastructure (technological neutrality) without fear of unfair licensing issues.

Open standard licences, for example Creative Commons (CC) licences could allow the re-use of PSI without the need to develop and update custom-made licences at national or sub-national level. CC0 public domain dedication is an effective legal tool that allows the waiving copyright and database rights on PSI, it ensures full flexibility for re-users and reduces the complications associated with handling numerous licences, with possibly conflicting provisions (Keller 2014). In the rare cases where the CC0 public domain dedication cannot be used, public sector bodies are encouraged to use open standard licences appropriate to a member state's own national intellectual property and contract law and that comply with the recommended licensing provisions.

## Example of Legal Framework: Copyright reform

In the area of copyright, the European Commission recently published its '**Report on the responses to the Public Consultation on the Review of the EU Copyright Rules**'. This report summarises the responses (over 11,000) that the Commission received in response to the copyright consultation held between December 2013 and March 2014. The results show conflicting positions between citizens and institutional users on one side and corporate rights holders on the other. Copyright can only work when it is perceived as fair by all stakeholders, seeking the right balance between the interests of creators (to control their work and to be able to make a living from their creativity) and the interests of society (access to information and culture, freedom of expression) (Keller, 2014)[49].

## INTEROPERABILITY[50]

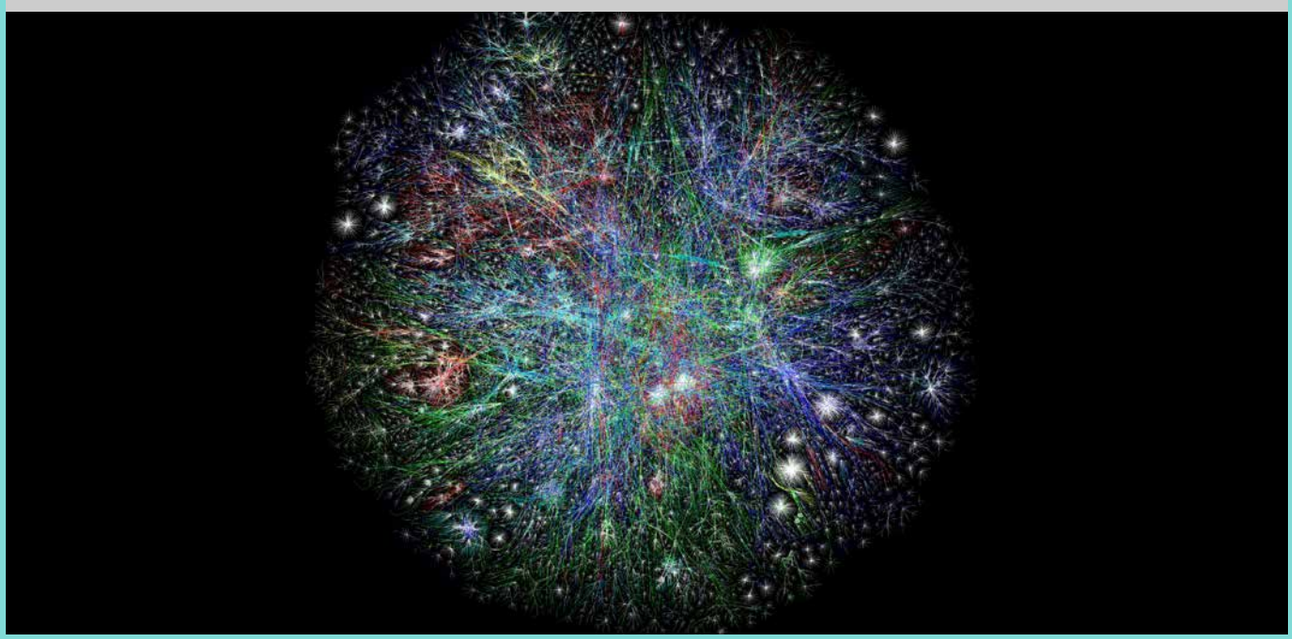
Interoperability should be implemented so that devices and services produced and delivered by different companies can communicate with one another. The Internet is the best example of the power of interoperability. Its open architecture has given billions of people around the world access to information, the possibility to add (web) content and services themselves, access to devices and modular applications that talk to one another. Today mobile devices with always-on Internet connectivity are becoming widespread.

## OPEN PLATFORMS

Users of the Internet ecosystem include the independent application and service providers who have the right to use the future Internet infrastructure (including both data in a raw and processed form, as well as access to computing resources). Any privileged access provided to the owner/managers of the infrastructure would alter free competition. All functionality must be exposed by way of open APIs[51] that expose data using open standards. User data and metadata should be represented in open formats such as XML[52] and RDF[53] (which includes Linked Data[54] and SPARQL end-points[55]). **Opening up access to an application's source code** exposes that code to a relatively large number of developers, subjecting it to rigorous critical inquiry of a pool of reviewers larger than the one proprietary developers have available to them internally.

## Example of Legal Framework: Net Neutrality

The preservation of **Net Neutrality**[56] is a crucial to define and make public how network operators manage traffic volumes and restrict applications usage. Network neutrality means that Internet service providers and governments should treat data traffic equally. Net neutrality protects freedom of expression and freedom of information online, reasserts the principle of fair competition and guarantees that users may freely choose between services online. The European Parliament adopted amendments to enshrine net neutrality in EU law at the beginning of April 2014. Currently the telecoms single market proposal has being reviewed by the Council (Member States) of the EU.



## OPEN DATA

People are not passive consumers of the data, but actively engaged in producing it. The primary advantage of open data is that it prevents the concentration power by leveraging asymmetries of information and differentials of access. Open access to data would enable developers to create applications and services built on freely acquired data, as long as they respect provisions in the license. Private data should also have its privacy dimension encoded using open standards and the correct licensing, as well as clear requirements for how to access this data and determine its ownership, both by vendors and end-users. This should include the right to remove data by its creators.

## Example of Legal Framework: Directive on the reuse of public sector

When the European Commission published its **directive on the reuse of public sector information (PSI)** in 2003 many member states, including France, the United Kingdom, Germany, the Netherlands and Spain began to promote and implement open data policies. The directive provided an EU-wide framework for governments, at all levels, to begin opening data. The European Commission estimates the economic value of the PSI market at approximately €40 billion per annum. The 2013 revision of the European Commission Directive on the re-use of public sector information will further enable the opening of public sector data in a harmonised and more transparent way.

Although changes in the European legal framework in the field of transparency and open data have already been implemented (i.e. the **directive on the re-use of public sector information in 2013** or several directives on the transparency of markets and trade) there is still a need to adapt to openness and innovation. Therefore, future DSI policy should consider creating a committee or working group to go over the existing directives and propose and formulate suggestions for a new legal framework for social innovation in the digital era.

## FEDERATED IDENTITY MANAGEMENT

User data is moving more and more into the 'Cloud' and people are getting their music, videos and applications digitally. The aggregated data extracted from the analysis of our identities (what companies define as "social graphs") and behavioural patterns of the user, is continuously mined and analysed with the main objective of maximising value extraction (e.g. for marketing, economic competition and surveillance).

In this context, the infrastructure should preserve the right of data-portability[57], and **prevent lock-in**, therefore allowing for innovation in the wider economy based on the Future Internet. Users must be able to come (no barriers to entry) and go (no barriers to exit) regardless of who they are (no discrimination) and what systems they use. Thus, the platform should also deploy not only open-standards but also standardised identity management, fully respecting the users' privacy and ownership of the data.

### Federated Social Web

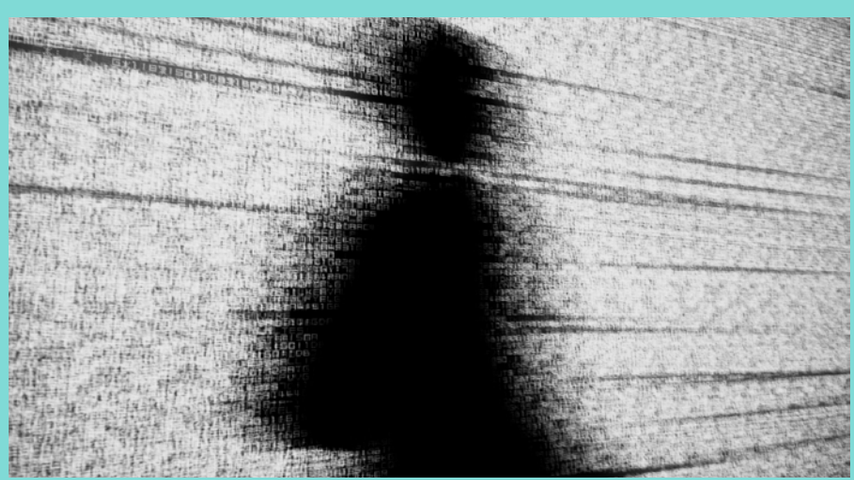
An important effort towards a federated identity system is the W3C **Federated Social Web Working Group**[58] to develop standards to make it easier to build and integrate social applications. These standards will give citizens greater control over their own social data, allowing them to share their data selectively across various systems. The federated web standards will also be implemented within the EC-funded D-CENT Project[59] that is piloting federated social applications for participatory democracy.

## PRIVACY-AWARE TECHNOLOGIES AND ENCRYPTION

**"Do-not-track"** technologies should be implemented in order to give users control over their social data and sensitive information, to make it easier for businesses to innovate on top of the infrastructure. There is a need for privacy-aware technologies based on trust and ethics, that can be filled by developing **technical solutions that are privacy enhancing 'by design'**. Technically, encouraging the use of HTTPS[60], the use of virtual private networks[61], adequate cryptographic public-key based infrastructure, strong authentication, as well as providing end-to-end encryption[62] should all be on the agenda. In particular, more support is needed for encryption and anonymity technologies, such as attribute-based credentials built by **ABC4TRUST**[63].

## DATA CONTROL AND DATA OWNERSHIP

A broader investigation on the implications of the current personal data market and the role of data brokers[64] will be crucial for understanding the future of bottom-up digital economies. **New forms of data control and data collective ownership** by citizens should be encouraged. For instance, in the UK, the government backed **Midata** programme is encouraging companies to bring data back to public control, while the US has introduced **green, yellow and blue buttons** to simplify the option of taking back your data (in energy, education and the Veterans Administration respectively).



## Personal data stores

There are also new available solutions, such as Mydex , Qiy, Citizenme[65] and many others that are part of an emerging sector of **Open Personal Data Stores**[66], **Privacy Dashboards, and Trust frameworks** to manage identity, that have emerged out of a new vision of identity management and trust that is advocating for a **new Deal on Data**[67] to balance the power between big companies, government and people over their personal information.

## Example of Legal Framework: The EU data protection reform package

The Data protection reform is currently being discussed by Member States The aim is to to build a single and comprehensive data protection framework to develop tools and initiatives to enhance citizen awareness, and to ensure that businesses receive guidance on data anonymisation and pseudonymisation. This should prevent any unauthorised collection, processing and tracking of personal information and profiling, including citizens' preferences, medical and health records and so on. Companies should be compelled to be transparent about how they collect users' personal data, and the real value they extract from trading personal information. Citizens should be able to claim their digital rights, including the right to control how personal data is used, the right to avoid having information collected in one context and then used for an unrelated purpose, the right to have information held securely, and the right to know who is accountable for the use or misuse of an individual's personal data. Firms might begin to reduce the length of period over which information is retained and adopt **certification schemes guaranteeing a high standard of privacy protection**.

## Example of Legal Framework: A Magna Carta for the Internet

Tim Berners Lee, the inventor of the Web is advocating for a sort of **Magna Carta for the Internet** to estabilish basic rights and freedoms, to keep the Internet open, without surveillance and censorship, and to halt power abuses from Governments and corporations. The Magna Carta for the Internet goes along with recent UN General Assembly (UNGA) resolution on *The Right to Privacy in the Digital Age*.[68]. A Magna Carta for all Web users could be directly crowd-sourced from the Web itself, engaging effectively in multi-stakeholder processes.

# 5.3 RESEARCH AND INNOVATION SUPPORT

## INVESTMENT ON ENABLING INFRASTRUCTURES

One important objective is to provide infrastructural investments such as broadband deployments and pan-European digital services that underwrite robust, equal, society-wide access to connectivity. However, while most resources are going to top-up deployments from Telcos and systems integrators such as FIPP or 5G PPP, there is scope for more experimental approach that invest on alternative infrastructures that are decentralised and open in nature.

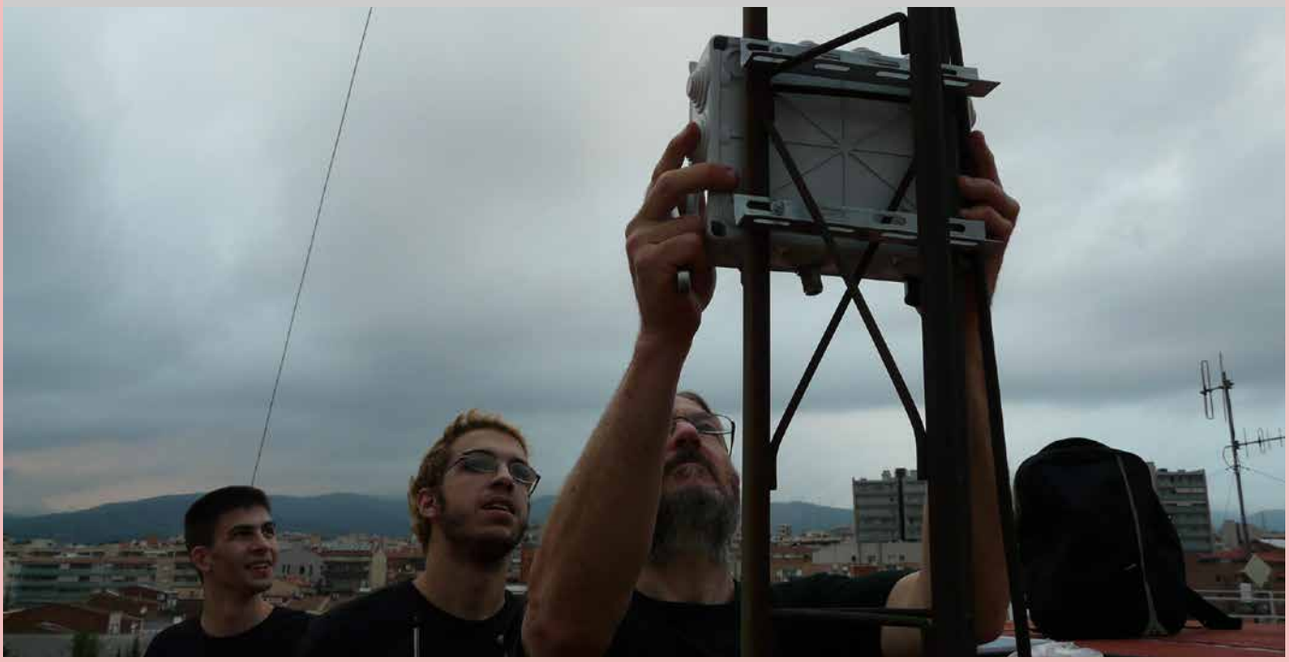
### Distributed and open architectures

**Distributed and open architecture**s are a key enabling factor for DSI to scale. If Europe wants to grow and scale an Innovation ecosystem for the social good, to drive long-term sustainable innovation-led growth, it needs investment in alternative architectures that favour new players and allow for bottom-up innovation. This includes the need for **distributed data repositories and management systems, distributed secure Clouds, distributed search, and federated social networking**.

It can also include the development of open source mobile phone alternatives such as FairPhone[69] on top of which a whole new open ecosystem of services and applications could flourish, based on open-source and open-hardware developments.

### Community and bottom-up networking

**Community and bottom-up networking** is an emerging mode of the Future Internet, where communities of citizens can build, operate and own open IP-based networks, as complementary solutions to commercial access networks from either commercial telecom companies or by local public providers. As shown by the European project Confine and **BuB for Europe** (Bottom-up Broadband)[70] these networks are rapidly expanding in terms of the numbers of nodes and people involved.



## INNOVATION LABS

In the context of future DSI policy, innovation labs present an opportunity to activate networks and to create collaborative work environments. In this context labs can be understood as spaces and units set up run and funded directly by government and driven by communities or public and private partnerships.

## Government labs

Nesta and Bloomberg Philanthropy in their study[71] of government funded innovation teams and labs highlight how four different types of government funded labs can help drive innovation, through better support for, development and utilisation of amongst others, digital social innovation.

***Creating solutions to solve problems***

**The Mayor's Office for New Urban Mechanics (MONUM),** which was launched in 2010, at the start of Boston Mayor Menino's fifth term, is a good example of this. It was the result of the Mayor's growing interest in accelerating the pace of innovation within the city administration, and to enable busy City Hall staff members to run innovation projects, often done in collaboration with external entrepreneurs and internal government policy experts.

***Engaging citizens and non-profits to find new idea***s

These labs focus on opening up government to voices and ideas from outside the system, often adapting the open innovation and challenge-led approach more commonly seen in the private sector and making use of strong communications and engagement strategies. One example of this is the **Seoul Innovation Bureau**, which is tasked with turning Seoul in South Korea into an innovation-led Sharing City, by engaging citizens in the radical redesign of public services.

***Transforming the processes, skills and culture of government***

**PS21 based in Singapore** is a good example of this. Initiated and driven by the Head of the Singaporean Civil Service, PS21 has created systemic interventions such the Staff Suggestion Scheme that creates an opportunity for any public officer to directly submit ideas to improve public services. Once submitted, ideas for improvement are sent to a Central Steering Committee, which is chaired by a Permanent Secretary, where they are vetted and considered for implementation.

***Achieving wider policy and systems change***

***Brining*** about transformation and looking beyond specific interventions to the wider policy context and complex systems that need to change, for example in healthcare, energy or education. **The innovation foundation Sitra in Finland**, which has has taken on large systemic challenges to Finnish society, such as creating devolved health care provision offers and growing the sustainable and renewable energy sector, is one example of this.

## Social and private labs

In addition to those set up and run by government to drive innovation in products and services, citizen engagement and policy development, there are vast often highly connected communities of private, academic and civic labs which proivde space and support for social innovatiors to experiment with and develop digital social innovations.

## Maker spaces, Hackerspaces, and co-working spaces

**Maker spaces** (such as Fablabs), *real-life testing and experimentation environments where users and producers can co-create innovations (including Living Labs),* **Hackerspaces** and hackathons (such as Chaos Communication Camp), and **co-working spaces** are a few examples.
In addition to exploring the role of labs run by government, DSI policy should seek to create stronger relationships between these communities and public policy, and promote their role in bringing users, developers, and entrepreneurs together to create new digital products, new public services or learning programmes.

The creation of **a European network that would encompass regional innovation labs** (both public and private), would bring coherence to the mission of innovation labs and would expand their use.

## INCUBATORS & ACCELERATORS

Mechanisms that foster social entrepreneurship such as **incubators, accelerators or other intermediary platforms** are necessary to provide resources in different phases of the development of DSI. They represent a novel contribution to advancing social entrepreneurship around the world, helping young companies, and particularly high-tech start-ups to grow and thrive. The number of accelerator programmes has grown rapidly in the US over the past years, and more recently, the trend is being replicated in Europe. For instance, the **Nesta report "Good incubation"**[72] charts the rise of social venture incubation, with a focus on what can be learned by this sector from other programmes around the world. Investment for this kind of innovation support programmes can come from public funds but could also be through public private partnerships or crowdfunding.

## TRANSITION project

A good example to foster a **European networks of incubators** is the European Commission funded **TRANSITION project**. It is coordinated by the European Business & Innovation Centre Network (EBN), and is a 30-month project that supports the scaling-up of social innovations across Europe by developing a network of incubators, which brings together established partners within the fields of social innovation (SI) and innovation-based incubation (IBI).

# 5.4 DISSEMINATION & LEARNING

## KNOWLEDGE SHARING & NETWORKING

Firstly, **tools for general dissemination** should be included. In the context of deploying the DSI strategy, the organisation of events is critical. This should include general events where the new policy framework is explained, including its goals and strategy. These should be targeted to European policy makers, state members in charge of innovation in their countries, local governments and the DSI community itself (labs, developers, entrepreneurs, start-ups networks, engaged citizens, etc.). In addition, in order to engage the DSI community, but also to promote the rise of creative and innovative ideas, **competitions and challenges or jams** would be very helpful mechanisms to deploy.

Secondly, beyond general events, **the DSI strategy requires a communication strategy**. This should include the use of social networking platforms, independent media and other news applications. For instance, the elaboration of a newsletter or creating a DSI strategy blog would be a helpful instrument to spread the message from the European Commission and to provide updated information about policy deployment.

### DSI networking and crowdfunding platform

**A DSI networking platform** that crowdmaps initiatives, identifies partners and collaborators with the needed expertise, identifies funding opportunities, and promotes new economic instruments (such as challenges, and prizes) should be the promoted, as the next stage in the evolution of http://digitalsocial.eu. The setting-up of the collaborative map for this project has shown the state of the development of the field. This map should be maintained with some improvements and updates, possibly **linking crowdmapping to crowdfunding and other bottom-up incentives mechanisms such as Prizes and Challenges.**

Thirdly, **knowledge sharing is key**. Best practices have to be collected and shared in order to learn from them. Moreover, dissemination programmes related to DSI policy should also develop tasks related to "evangelisation" of the benefits of DSI. One task would be persuading Parliaments, assemblies, and municipalities to adopt open tools, to be transparent, participative, and open to citizens.

## TRAINING

**Training will also be essential**, especially in bridging the digital skills gap, but also in empowering the DSI community.

### Fabacademy

Specific training could be set-up but the DSI community itself, as is done today by Fablabs with the **Fabacademy**, by Hacklabs and Makerspaces with free software and open hardware training, or by the Open Data Institute (ODI) and Open Knowledge Foundation on open data, and by organisations such as Tactical tech or Open Rights Group on privacy and digital rights.

# 5.5 EVALUATION

**Just as it is the case with social innovation, digital social innovations need to demonstrate their impact to make the case for spreading, scaling and attracting funding opportunities. As DSI evolves policymakers need to understand the extent to which the policies they are putting in place to support DSI are effective.**

Most reports about innovation refer to GDP and financial return as one of the main indicators used to measure impact. However, as described throughout this paper, DSI seek to address a wider set of societal challenges, from environmental pollution to chronic health conditions. Any approach to understanding and measuring the impact of DSI on both a macro level as well on a project-based level needs to **go *beyond GDP*** to establish what **non-financial benefits** DSI have or have not helped to achieve.

## MEASURING AND UNDERSTANDING THE IMPACT OF DIGITAL SOCIAL INNOVATIONS

There is a growing body of knowledge on how to measure and understand the impact of social innovation policy, which DSI frameworks should also build on. The EC report **Strengthening Social Innovation in Europe**[73] reviews a number of indicators for measuring social and non-social innovation, including **the European Public Sector Innovation Scoreboard** and the **WARM Wellbeing and Assessment Model** to assess the social capital and wellbeing of local areas.

### What is measured? Common standards of evidence and adoption

There is a need to harmonise sound metrics to assess the impact of DSI activities, including the role of ICT networks, number of people/communities involved and wider societal criteria such as social satisfaction, wellbeing, ecological footprint and social inclusion. A review of some of the existing methods and frameworks for measuring and understanding the impact of social innovation, as well as digital social innovation specifically, provides some guidance on how this can be done.

### Beyond GDP initiative

The **Beyond GDP initiative**[74] and the **OECD Better Life Index**[75] can both be used as indicators for understanding the macro level impact of policies, as well as the impact of individual DSI projects (i.e. what are the health outcomes, impacts on social exclusion and civic engagement of the innovation).

## The Triple Helix of Social Tech

**The Triple Helix of Social Tech**: **Nomine Trust framework for measuring the social, user and financial value generated by digital social innovation organisations and their projects**

The Triple Helix outlines how social tech ventures, and investors, should focus on three types of value – **Social Value, User Value and Financial Value –** when developing and scaling their project(s)[76]

| | What is it | How it can be measured |
|---|---|---|
| **Social Value:** | The potential social change the venture intends to create i.e positive impact health, resilience and sustainability society. Social value is the extent to which this is realised. | • Qualitative responses to the idea - interviews or meetings/consultation with key stakeholders, such as domain experts and possible purchasers of the service to establish what social challenges need to be addressed and how the product or service could address them<br>• Quantitative analysis of the idea, for example using surveys to test the idea with key parties, or analysing existing data sets to understand the extent of the social issue<br>• Online responses to the proposed service from partners or potential customers. |
| **User value:** | In order to realise any of the potential social value, a social tech venture needs to demonstrate value to users, i.e it is a product or service that people want to pick up and use because it meets their individual needs. | • Qualitative interviews with key users of the product or service to test need and demand for the approach including the specific user problems the product or service would solve.<br>• Observing potential users to see if the product works in their context<br>• Quantitative responses to the idea, for example survey potential users to test whether needs established within qualitative interviews apply to a larger user group<br>• Online responses to the proposed service from potential users, using analytics software to test demand. |
| **Finan-cial Value:** | There has to be a market for the venture to be sustainable and the venture has to be active in it. The generation of sustainable income is understood as financial value, which comes as the result of realising user or social value. | • Establishing an agency or provider who has the responsibility or interest in addressing the social need the product or service is attempting to address<br>• Gathering financial indicators of the negative impacts of the established social need the product or service is looking to address<br>• Establishing that there is a market for this, for example, has the policy context shifted to make this an area that is likely to be outsourced from public services?<br>• Establishing potential routes to market |

### How the impact is measured

As emphasised in the framework developed by Nominet Trust there are a number of tools digital social innovations can apply to capture the impact of their work, from user observations to market testing and capturing indicators of financial savings.

## Nesta Standards of Evidence framework

Looking specifically at different tools for measuring both financial and social impact, Nesta has developed the **Standards of Evidence** framework. It proposes different types of evidence and tools based on the development stage and maturity of the social innovation, beginning with the most basic evidence at level one to the most refined evidence at level five.

| Level | Expectation | How the evidence can be generated |
|---|---|---|
| **Level 1** | You can give an account of impact. By this we mean providing a logical reason, or set of reasons, for why your products/service could have impact on one of our outcomes, and why that would be an improvement on the current situation. | You should be able to do this. yourself, and draw upon existing data and research from other sources. |
| **Level 2** | You are gathering data that shows some change amongst those using your product/ service | At this stage, data can begin to show effect but it will not evidence direct causality. You could consider such methods as: pre and post survey evaluation; cohort/panel study, regular interval surveying |
| **Level 3** | You can demonstrate that your product/service is causing the impact, by showing less impact amongst those who don't receive the product/ service. | We will consider robust methods using a control group (or another well justified method) that begin to isolate the impact of the product/ service. Random selection of participants strengthens your evidence at this level; you need to have a sufficiently large sample at hand (scale is important in this case). |
| **Level 4** | You are able to explain why and how your product/service is having the impact you have observed and evidenced so far. An independent evaluation validates the impact you<br><br>observe/generate. The product/ service delivers impact at a reasonable cost, suggesting that it could be replicated and purchased in multiple processes. locations. | At this stage, we are looking for a robust independent evaluation that investigates and validates the nature of the impact. This might include endorsement via commercial standards, industry kitemarks etc. You will need documented standardisation of delivery and you will need data on costs of production and acceptable price point for your customers. |
| **Level 5** | You can show that your product/ service could be operated up by someone else, somewhere else and scaled–up, whilst continuing to have<br><br>positive and direct impact on the outcome and remaining a financially viable proposition. | We expect to see use of methods like multiple replication evaluations future scenario analysis; fidelity evaluation. |

The standards are used by the DSI accelerator Bethnal Green Ventures[77] and Nesta's Impact Investment team[78], which invests between £150,000 and £1 million in organisations whose digital social innovations are designed to address key societal challenges. Building on this, the standards can help social innovations or organisations working with social innovations to structure their evaluation strategy to continue move up the levels of evidence. The standards can also be adopted by government programmes, as was the case with **UK Cabinet Office Centre for Social Action Innovation Fund**, which uses the Standards of Evidence to assess social innovations that are considered for support.

# IMPACT OF DIGITAL SOCIAL INNOVATION POLICY

**Digital Social Innovation** is a young field, and there are few examples of policies specifically designed to support DSI – and even fewer specific tools and frameworks for understanding the impact of these. However, there are some emerging examples of frameworks that could guide in the development of assessment tools for DSI.

The work done by **Wikiprogress** is exploring new digital tools for including people, in relation to what should be measured through the development of indicators, as well as how to undertake measurement[79].

## Collective Awareness Platforms

In the context of **Collective Awareness Platform Initiatives**, **IA4SI (impact assessment for social innovation)** is a support action aiming at developing a common methodology able to evaluate the socio-political, economic and environmental impacts of collective platforms. This ongoing project will provide three online tools for self-assessment, enabling projects to understand and improve their impact.

In addition to the above, future indicators to measure impact of DSI policy could include specific metrics, which **focus on the key components of the *digital* element of digital social innovation**.

## Webindex

**The Global Open Data Index** developed by the Open Knowledge Foundation[80] and the **Webindex** developed by the World Wide Web Foundation[81] illustrate examples of how this could be captured and measured. Another metric to focus on could be **the number of Creative Commons licenses** awarded within different fields, regions and countries, as measured by the non-profit Creative Commons in their annual **The State of the Commons report**[82].

# LESSON FROM EXISTING INNOVATION POLICY FRAMEWORKS

A number of additional lessons can be learned from existing frameworks for measuring the impact of innovation policy. As described by the Manchester Institute of Innovation Research in their work on the **"Compendium of Evidence on Innovation Policy"**[83] measuring the impact of any innovation policy is very difficult. The main issue is developing an evaluation methodology, as the majority of evaluation approaches for R&D policies often focus on econometric analysis of the additionality of input and/or output.

## Innovation policy frameworks examples

There are number of insights from instruments such as the **Innovation Union Scoreboard (IUS)** which was developed to provide a comparative assessment of the innovation performance of the EU Member States, the **OECD Science, Technology and Industry Outlook**[84] and **OECD Innovation Policy Platform (IPP)**[85], a joint OECD and World Bank initiative, which looks at key statistical sources for measuring input (such as firm level micro data, R&D statistics, labour force survey), which could evolve to measure the impact of DSI policy, for example by looking at open licensing schemes and Creative Commons alongside IPR.

These indicators now include innovative entrepreneurship and innovation in firms, universities and public research institutes, and could include DSI products and services generated, as well as new types of actors such as Fab Labs and makerspaces.

## RECOMMENDATION FOR EVALUATION

Building on the above discussion, this table outlines the measures that a framework for assessing DSI should includ

| Guidelines for assessing the impact of Digital Social Innovation<br><br>Assessment must… |
|---|
| ✓ Go beyond GDP growth i.e Focus on both the social as well as the financial value and outcomes generated by the digital social innovation |
| ✓ Go beyond focusing on additionality of input/output |
| ✓ Solve how to measure effectiveness in order to provide guide for policy makers |
| ✓ Define what “impact” means:<br>o Beyond increase of performance<br>o Including not only short term but also long term dimension |
| ✓ Include multiple causality of factors |
| ✓ Take place according to stages: phased evaluation |
| ✓ Avoid isolated evaluation |
| ✓ Provide link between academic evaluation and evaluation reports (more professional, consultancy based, etc.) |
| ✓ Explore DSI specific indicators such as Open Data access, digital skills and proliferation of open source projects or creative commons licenses. |

# 6

# CONCLUSIONS AND POLICY RECOMMENDATIONS

# WHAT SHOULD POLICYMAKERS DO?

Broadly, there are four main ways policymakers and governments can support digital social innovation.

## 1. Invest in digital technologies for the social good: Make it easier to create new digital SI through specific regulatory and funding measures

This focus could be on four key areas of opportunity in DSI.

**a. Collaborative economy**

**b. Digital social innovation in cities and public services**

**c. Open tools and distributed architectures**

**d. Citizen engagement and direct democracy**

In general, European funding has heavily invested in core European institutions in terms of digital innovation, in particular the formerly nationalised telecommunications companies, as well as national research institutes and traditional universities. Building on existing schemes, such as innovation partnerships and PPPs with bigger telecommunications corporations, new schemes could be created to provide financial support for large-scale DSI experiments across Europe. This could involve making it easier for cities, regions, health authorities and universities to pilot large-scale DSI experiments around collaborative economy, direct democracy, distributed energy, civic health and bottom-up smart city solutions.

Many of the inventions that now form the basis of the digital economy and the emerging Internet of Things have their roots in strong public investment that funded general-purpose technologies and basic research. However, non-institutional actors (hackers, geeks, social innovators and activists) are key in this process since they are able to generate creativity, develop new experimental methods and engage large-scale communities.

It is precisely these kinds of non-institutional actors that do not have sufficient support in Europe now and that can take huge advantage of the building of a Europe-wide constituency, by interconnecting initiatives, sharing resources, removing barriers to enter existing markets and building synergies.

Within the single digital social market it should be easier for digital social innovations such as collaborative economy and crowd-funding platforms to manage and distribute assets (financial as well as non-financial) between citizens in different EU countries.

## 2. Make it easier to grow and spread DSI through public procurement support for evidence generation, common standards and integration with public services.

DSI has the opportunity to improve public services, cut costs and improve the environment. Easier procurement could be a route to scale and higher impact – this requires attention to the details of how procurement is organised (e.g. to make it easier for smaller organisations to win contracts), but also much more systematic orchestration of marketplaces bringing together providers and potential buyers. As an example, the Fukushima prefecture in Japan hosts a map of the Safecast data on its website, and in Reykjavik, Iceland, the city council takes on board and debates ideas from Your Priorities, a platform that hosts citizen ideas for how to improve the city.

In particular government procurement methods should seek to support DSI through:

1. Focusing on the financial as well as the social impact (such as health outcomes and wellbeing, for example) when procuring services. Particularly for DSI this could include valuing the network effect and digital engagement of users provided by procured services.

2. Make it easier for smaller DSI organisations or consortia of these to compete with telecommunications corporations to for public contracts.

3. Support the scaling of DSI, through reuse and repurposing of existing solutions, by encouraging (and where possible making it mandatory) that any publicly funded service or product is open sourced and/or licensed under Creative Commons.

4. Joint commissioning by public bodies of DSI.

## 3. Increase the potential value of DSI (e.g. making available distributed architectures, common frameworks and open standards, as well as supporting innovation spaces)

Overall, there is a need for a public, common framework for the design of DSI solutions and infrastructures underpinned by open protocols, open standards, regulatory mechanisms and collective governance models based on democratic and participatory processes.

In order for bottom-up innovation to scale and deliver social value, public, open, neutral, privacy-aware and distributed architectures should be in place. Interoperable, customised and modular services and applications based on open source, open access and open hardware can then be built on top of a public federated platform in a dynamic and flexible way, plugging into existing and future Internet infrastructures.

At regulatory level, **The Digital agenda emphasises the need to adopt *open standards and interoperable solutions*** to fully exploit the development of existing and emerging technologies. **These open standards** should not be optional; they should become public policy guidelines at the core of the technical infrastructure.

**Technical solutions do not work by themselves, therefore legal and commercial solutions have to be based in technology and integrated with the appropriate policy framework**.

As digital technology becomes more pervasive, **the issue of what public data is, and the question of who controls it, is becoming more important**. Thus **data portability, federated identity management and trust frameworks** should be encouraged. Defining sensible governance modalities for the data infrastructure and the DSI ecosystem will require a large collaboration between public and private.

Ultimately, just as in science and technology, innovation in society needs carefully crafted investment and support. **There is a need to maximise the social value generated by digital technologies** and to socialise returns in order to be able to invest in the next waves of social innovations and achieve longer-term systemic change.

In addition to this cities and governments could further increase the potential for DSI by investing in some of the spaces and developer communities from where DSI often emerges, such as **makerspaces, Fab Labs and hackerspaces**. Examples of cities already prioritising this are: the City of Shanghai, which has proposed to fund a hundred makerspaces throughout the city with six opened to date, to enable the city's capacity to make; and Barcelona, which is experimenting with becoming a Fab City, working more strategically with makerspaces in the city to develop solutions to urban challenges.

## 4. Enable some of the radical and disruptive innovations emerging from DSI – such as new approaches to money, consumption, democracy, education and health.

As in other sectors, some of the innovations in this field have very radical implications – for instance, for the future of money or education. Policymakers need to provide space for more radical ideas to be tested out in towns and cities across Europe, using knowledge about how systemic innovation can best be organised. In some cases substantial investment will be needed to support innovations through to sustainability – just as in business, where many of the most transformative innovations required many years of patient, large-scale investment before they delivered returns.

Alternative socio-economic models based on trust and their reputations are emerging. Different DSI activities are piloting new ways in which communities can be mobilised, managing access to shared (financial and non-financial) resources, collaborative workspaces and even developing alternative exchanges and payment systems.

Even if it is impossible to foresee the precise impact and quantify the multiplier effect of the mapped DSI activities, there is a need to harmonise sound metrics to assess the impact of DSI activities, including the role of ICT networks, number of people/communities involved and 'beyond GDP' criteria such as social satisfaction, wellbeing, ecological footprint and social inclusion.

## 5. Expand the European Digital Social Innovation network and invest in the development of skills and training

One of the biggest barriers to making the most of DSI, is the significant gap in the skills and capacity to experiment with and develop new digital social innovations. In addition, **citizens should fully participate** in the innovation process, applying collaborative and multidisciplinary methodologies and other innovation tools to facilitate their involvement. Citizen engagement will certainly maximise the societal impact of innovation and it would make sure that services deployed answer to concrete unmet local needs and demand.

In countries where DSI is relatively advanced, such as the Netherlands and the UK, the majority of DSI is developed by new organisations with fewer incumbents, such as established charities exploring this potential. In addition to this, our crowdmap of DSI happening across the EU shows that while there is relative high activity in in West and Southern Europe, Eastern Europe in particular is lagging behind. To address this, policymakers should:

1. Grow the www.digitalsocial.eu network to enable more opportunities for collaboration through the platform, such as the opportunity for organisations to jointly develop new projects and apply for funding through innovative mechanisms such as challenges, prizes and crowdfunding.

2. Increase early-stage seed funding programmes and other types of non-financial support that are vital in helping innovators experiment with and develop DSI projects. The incubator programme run by the UK's Open Data Institute and the DSI accelerator programme run by Bethnal Green Ventures have demonstrated potential in how models developed to support early-stage businesses can be adapted to support and grow DSI projects.

3. Support programmes that help people and organisations develop their skills to work on Digital Social Innovation, such as getting digital skills on the curriculum in schools and helping civil society organisations experiment with the development of digital solutions.

Help grow DSI capacity in Eastern Europe by facilitating collaboration between established DSI networks and organisations from the rest of the EU. Identify specific social challenges (such as health, employment, urban regeneration and care) facing countries in Eastern Europe and invest in pilots that explore how digital social solutions could address them.

# APPENDIX

# DSI ADVISORY GROUP (AG)

| | |
|---|---|
| Rob van Kranenburg | Co-founder of Bricolabs/Founder of the Internet of Things Council/Community Manager of |
| Roger Torrenti | CEO, Sigma Orionis |
| Mayo Fuster Morrell | Fellow of the Berkman Centre, Researcher, Institute of Govern and Public Policies (AUB) |
| Gohar Sargsyan | Adviser and founding member, OISPG; Consultant Logica |
| Daniel Kaplan | Founder and CEO, the Next-Generation Internet Foundation |
| Simona Levi | Founder, Forum for the Access to Culture and Knowledge |
| Markkula Markku | Committee of the Regions, Rapporteur Europe 2020 |
| Philippee Aigrain | Founder and CEO Sopinspace, the Society for Public Information Spaces |
| Ezio Manzini | International Coordinator, DESIS, Design for Sustainability Network |
| Zoe Romano | Digital Strategy and Wearables, Arduino, Milan |
| Geert Lovink | Institute of Network Culture (INC) |
| Flore Berlingen | OuiShare, Co-Founder |
| Juha Huuskonen | Open Knowledge Foundation Finland |
| Javier Ruiz | Open Rights Group |

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## Endnotes

### Why is Digital Social Innovation Important?

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**ACKNOWLEDGEMENTS**

We are incredibly grateful to the European Commission, DG Connect for funding this project. We are particularly grateful to Fabrizio Sestini for his guidance and support throughout the project.

This project wouldn't have succeeded without the support from a number of colleagues. At Nesta we would especially like to thank Jo Casebourne, Jon Kingsbury and Geoff Mulgan for leading the project and providing thoughtful comments, critique and guidance throughout, and Kelly Armstrong and Jordan Junge their management of the project. At the Waag Society we would like to thank Marleen Stikker, Sacha Van Tongeren, Ivonne Jansen-Dings, Ning Xu and Niels Schrader. And at IRI we kindly thank Bernard Stiegler, and Vincent Puig.

In addition to Nesta, Esade and the Waag a number of organisations and people have played a key role in this project. For their work on developing www.digitalsocial.eu we would like to thank Julian Tait and Kevin Smith from Future Everything, Bill Roberts and Ric Roberts from Swirrl, Marcin Ignac from VariableIO and Agnese Mosconi for her beautiful design work.

Thank you to the projects Advisory Group who have been generous in sharing their own experience from working with and researching digital social innovation, and steering our research.

Daniel Kaplan, Ezio Manzini, Flore Berlingen, Geert Lovink, Gohar Saragsyan, Javier Ruiz, Louise Pulford, Markku Markkula, Mayo Fuster Morell, Philippe Aigrain, Rob van Kranenburg, Roger Torrenti, Simona Levi and Zoe Romano.

We would also like to thank the experts from around Europe who attended our DSI policy workshop in Brussels on February 17th, 2014, whose ideas were used to shape the final set of policy recommendations in this paper.

Over the course of this project we have spoken to numerous experts in the Europe and internationally, some of them are researchers or commentators, others are practitioners working on digital social innovation. There are too many to name here, but we thank them all for sharing their successes, lessons and experiences.

Finally we would like to thank the more than 1000 organisations who have taken the time to join www.digitalsocial.eu and map their digital social innovation project, which has been key to our understanding of DSI in Europe.

As ever, all errors and omissions remain our own.

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CATALOGUE NUMBER: KK-01-15-069-EN-N ISBN: 978-92-79-45603-9 DOI: 10.2759/448169